How to Use *COMcheck* *Energy Code Compliance Software*

U.S. Department of Energy
Building Energy Codes Program

When does COM*check* apply?

Commercial New Construction, Alterations and Additions

- Commercial Buildings include all buildings except
  - Single family
  - Low rise multi-family < 3 stories in height

- State Dependent
  - Not all states have the same code, some states have state-specific energy codes
  - Check to see what code is applicable in your state and if COM*check* is accepted
  - Status of State Codes
  - http://www.energycodes.gov/implement/state_codes/index.stm

Components that Must Comply with the Energy Code

Building Envelope

- construction assembly (materials & insulation levels)
- windows, doors & skylights

Mechanical Systems

Service Water Heating

Lighting Systems

How do they correlate in COM*check*?
No trade-offs between systems!

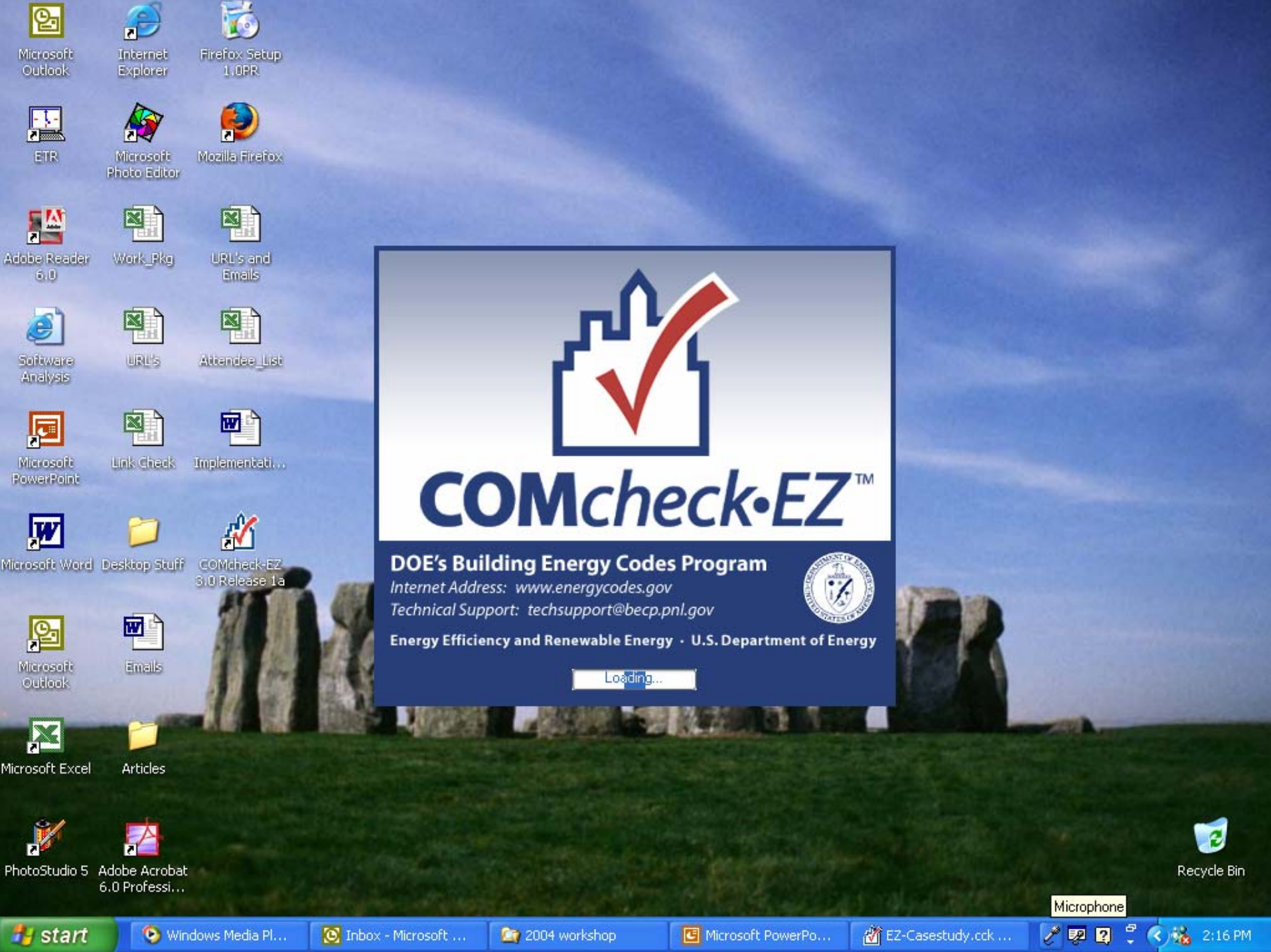
What is COM*check-EZ*?

- Envelope
  - trade-off calculations are based on envelope loads only
  - defines a proposed design and a budget design
- Lighting
  - Watts/square foot (LPDs)
- Mechanical
  - short wizard to customize a list of requirements applicable to the system identified

What Do I Need to Know?

Information you need to use COMcheck-EZ:

1. General Understanding of Windows-based Computer Programs
2. Basic Information about the Builder and Project to be Constructed
3. Building Plans including Exterior Wall Areas, Glazing Areas, Roof/Ceiling Areas, Basement Wall Areas, etc.
4. Insulation R-Values, NFRC Glazing and Door U-Factors, etc.
5. Lighting
6. Heating and Cooling System Efficiencies
7. Service Water Heating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Internet Explorer
Firefox Setup 1.0PR
ETR
Microsoft Photo Editor
Mozilla Firefox
Adobe Reader 6.0
Work_Pkg
URL's and Emails
Software Analysis
URL's
Attendee_List
Microsoft PowerPoint
Link Check
Implementati...
Microsoft Word
Desktop Stuff
COMcheck-EZ 3.0 Release 1a
Microsoft Outlook
Emails
Microsoft Excel
Articles
PhotoStudio 5
Adobe Acrobat 6.0 Professi...
COMcheck-EZ™
DOE's Building Energy Codes Program
Internet Address: www.energycodes.gov
Technical Support: techsupport@becp.pnl.gov
Energy Efficiency and Renewable Energy · U.S. Department of Energy
Loading...
Recycle Bin
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start
Windows Media Pl...
Inbox - Microsoft ...
2004 workshop
Microsoft PowerPo...
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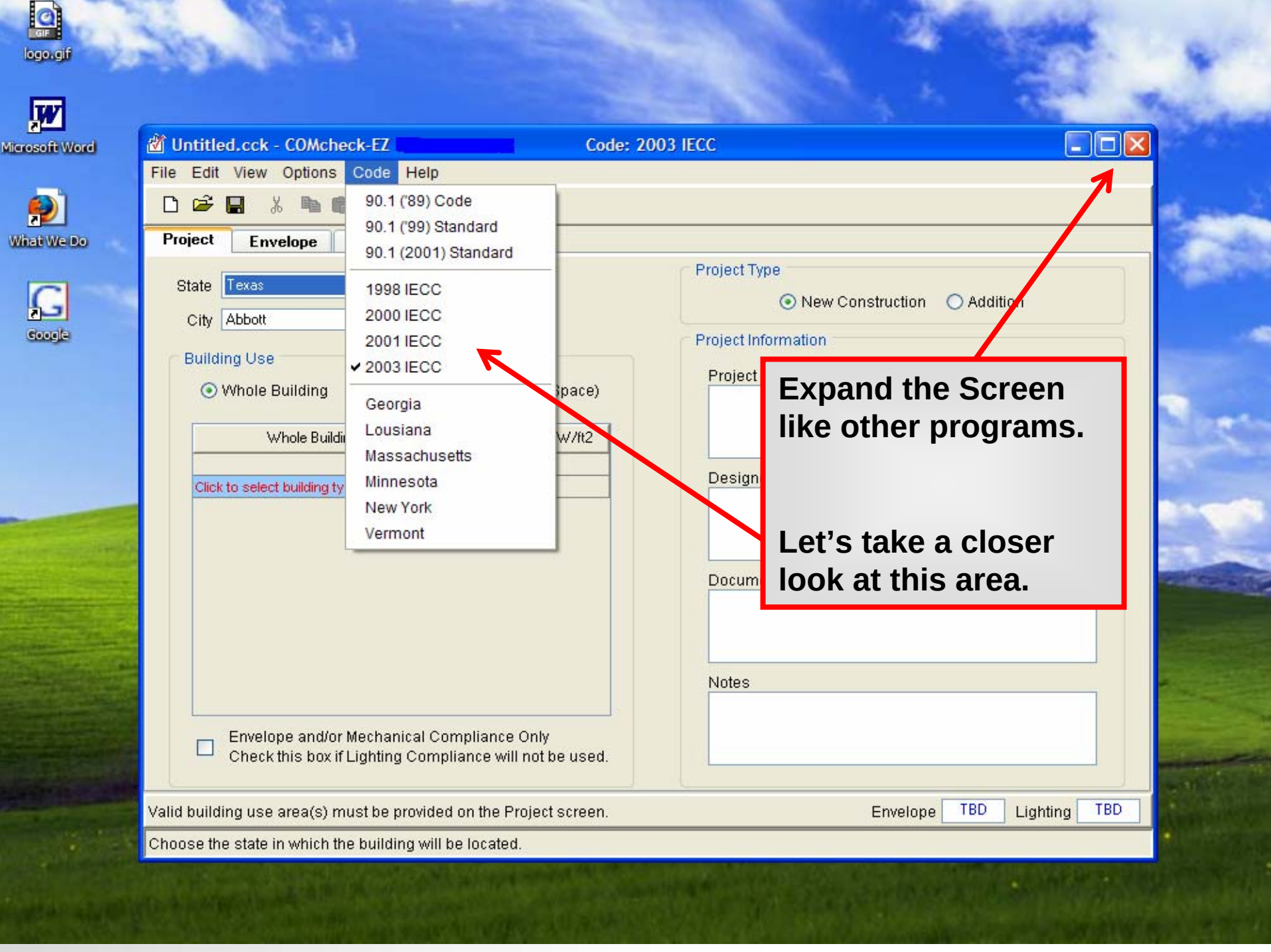
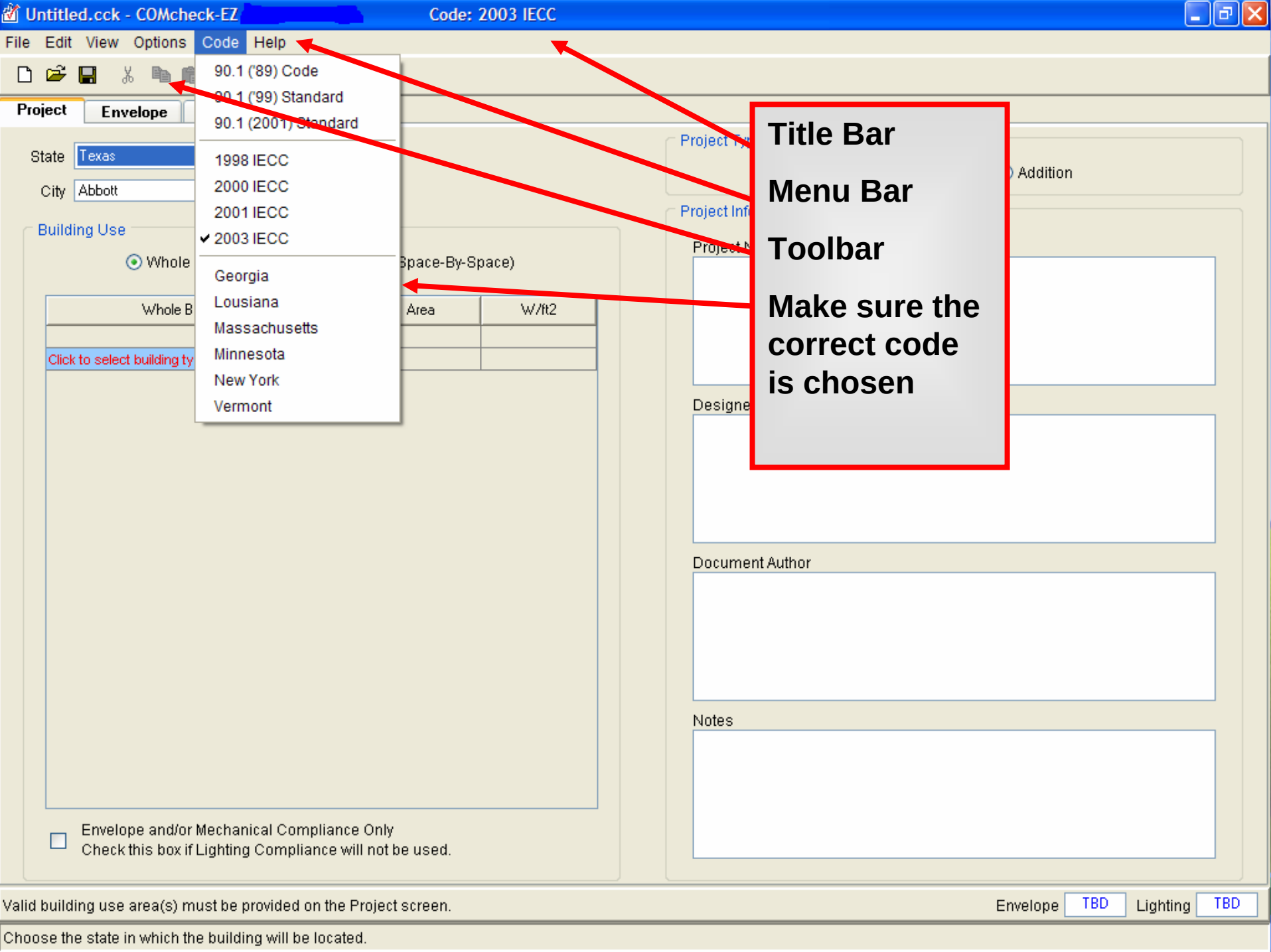

logo.gif
Microsoft Word
What We Do
Google
Untitled.cck - COMcheck-EZ
Code: 2003 IECC
File Edit View Options Code Help
90.1 ('89) Code
90.1 ('99) Standard
90.1 (2001) Standard
1998 IECC
2000 IECC
2001 IECC
2003 IECC
Georgia
Lousiana
Massachusetts
Minnesota
New York
Vermont
Project
Envelope
State Texas
City Abbott
Building Use
Whole Building
Click to select building ty
Envelope and/or Mechanical Compliance Only
Check this box if Lighting Compliance will not be used.
Project Type
New Construction
Project Information
Project
Design
Docum
Notes
Expand the Screen like other programs.
Let's take a closer look at this area.
Valid building use area(s) must be provided on the Project screen.
Envelope TBD
Lighting TBD
Choose the state in which the building will be located.


Untitled.cck - COMcheck-EZ
Code: 2003 IECC
File
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View
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Code
Help
90.1 ('89) Code
90.1 ('99) Standard
90.1 (2001) Standard
1998 IECC
2000 IECC
2001 IECC
2003 IECC
Georgia
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Minnesota
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Building Use
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Space-By-Space)
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Addition
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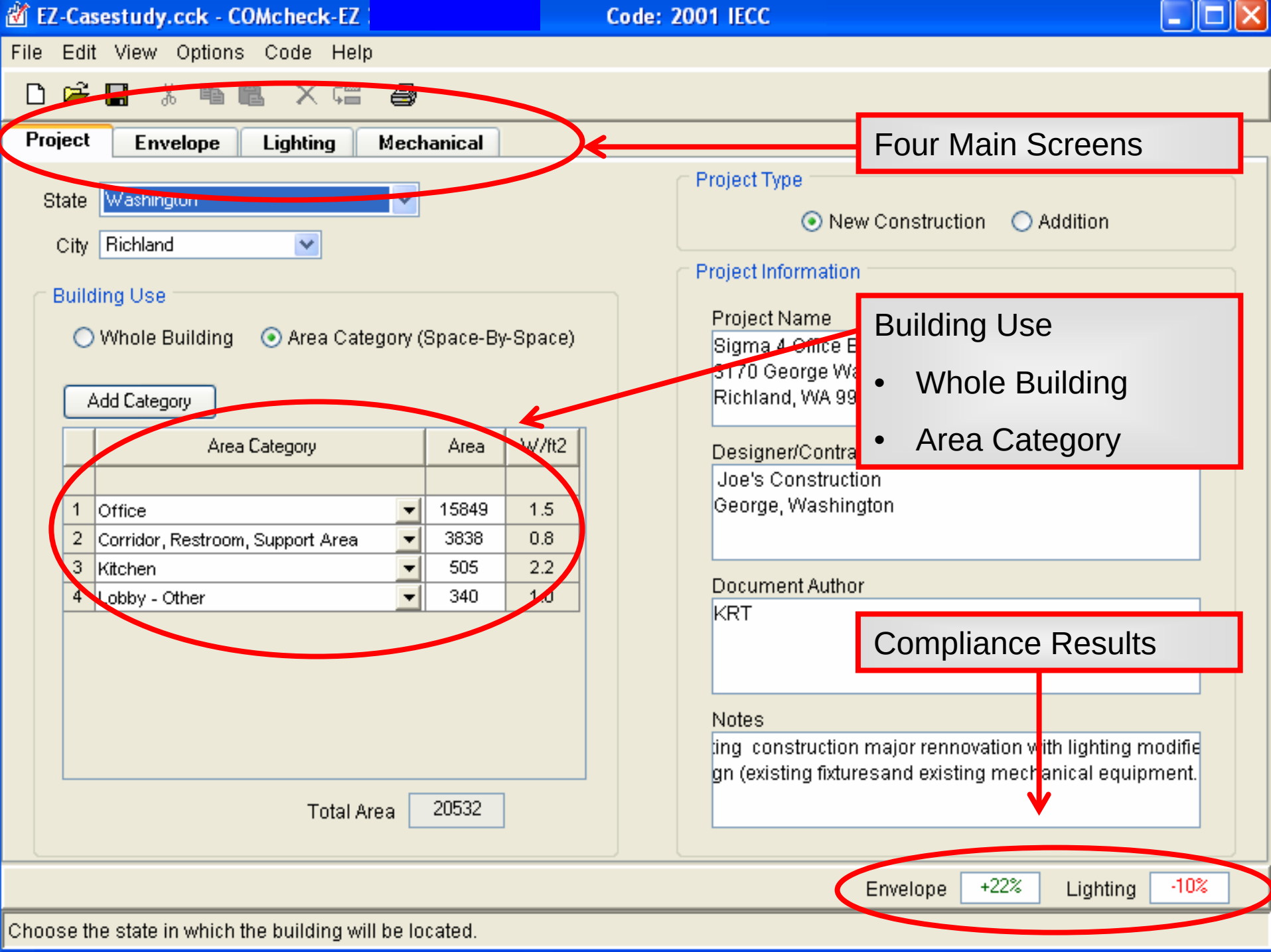
Document Author
Notes
Envelope and/or Mechanical Compliance Only
Check this box if Lighting Compliance will not be used.
Valid building use area(s) must be provided on the Project screen.
Envelope
TBD
Lighting
TBD
Choose the state in which the building will be located.
Title Bar
Menu Bar
Toolbar
Make sure the correct code is chosen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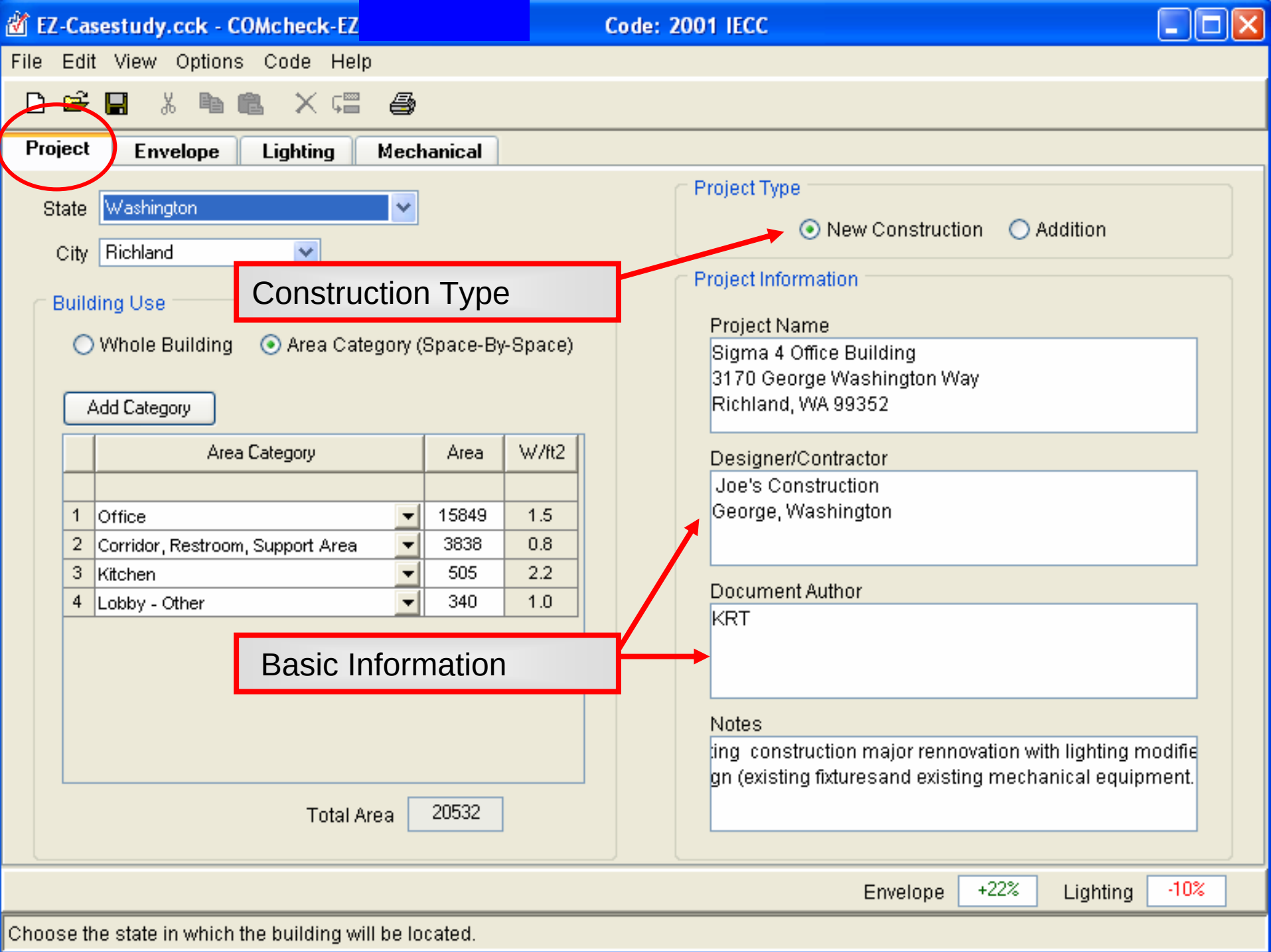
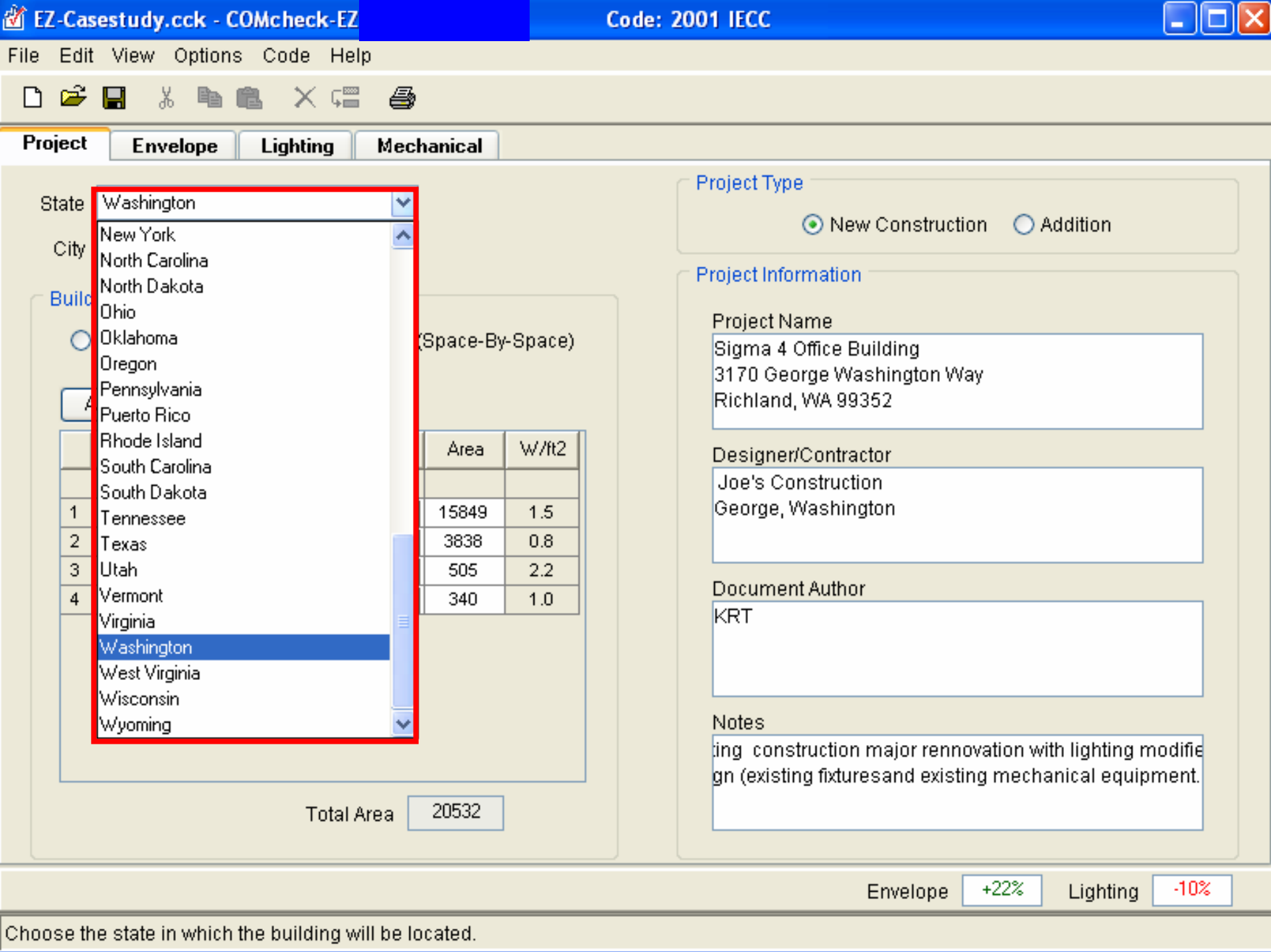
File Edit View Options Code Help
Project Envelope Lighting Mechanical
Four Main Screens
State Washington
City Richland
Project Type
New Construction
Addition
Building Use
Whole Building
Area Category (Space-By-Space)
Project Information
Project Name
Sigma 4 Office B
3170 George Wa
Richland, WA 99
Building Use
• Whole Building
• Area Category
Add Category
Area Category
Area
W/ft2
1 Office 15849 1.5
2 Corridor, Restroom, Support Area 3838 0.8
3 Kitchen 505 2.2
4 Lobby - Other 340
Designer/Contra
Joe's Construction
George, Washington
Document Author
KRT
Compliance Results
Notes
ing construction major rennovation with lighting modifie
gn (existing fixturesand existing mechanical equipment.
Total Area 20532
Envelope +22%
Lighting -10%
Choose the state in which the building will be located.


EZ-Casestudy.cck - COMcheck-EZ
Code: 2001 IECC
File Edit View Options Code Help
Project
Envelope
Lighting
Mechanical
State Washington
City Richland
Building Use
Whole Building
Area Category (Space-By-Space)
Add Category
Area Category
Area
W/ft2
1 Office 15849 1.5
2 Corridor, Restroom, Support Area 3838 0.8
3 Kitchen 505 2.2
4 Lobby - Other 340 1.0
Total Area 20532
Project Type
New Construction
Addition
Project Information
Project Name
Sigma 4 Office Building
3170 George Washington Way
Richland, WA 99352
Designer/Contractor
Joe's Construction
George, Washington
Document Author
KRT
Notes
ting construction major rennovation with lighting modifie
gn (existing fixturesand existing mechanical equipment.
Construction Type
Basic Information
Envelope +22%
Lighting -10%
Choose the state in which the building will be located.


EZ-Casestudy.cck - COMcheck-EZ
Code: 2001 IECC
File Edit View Options Code Help
Project Envelope Lighting Mechanical
State Washington
City
New York
North Carolina
North Dakota
Ohio
Oklahoma
Oregon
Pennsylvania
Puerto Rico
Rhode Island
South Carolina
South Dakota
Tennessee
Texas
Utah
Vermont
Virginia
Washington
West Virginia
Wisconsin
Wyoming
(Space-By-Space)
Area W/ft2
1 15849 1.5
2 3838 0.8
3 505 2.2
4 340 1.0
Total Area 20532
Project Type
New Construction Addition
Project Information
Project Name
Sigma 4 Office Building
3170 George Washington Way
Richland, WA 99352
Designer/Contractor
Joe's Construction
George, Washington
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KRT
Notes
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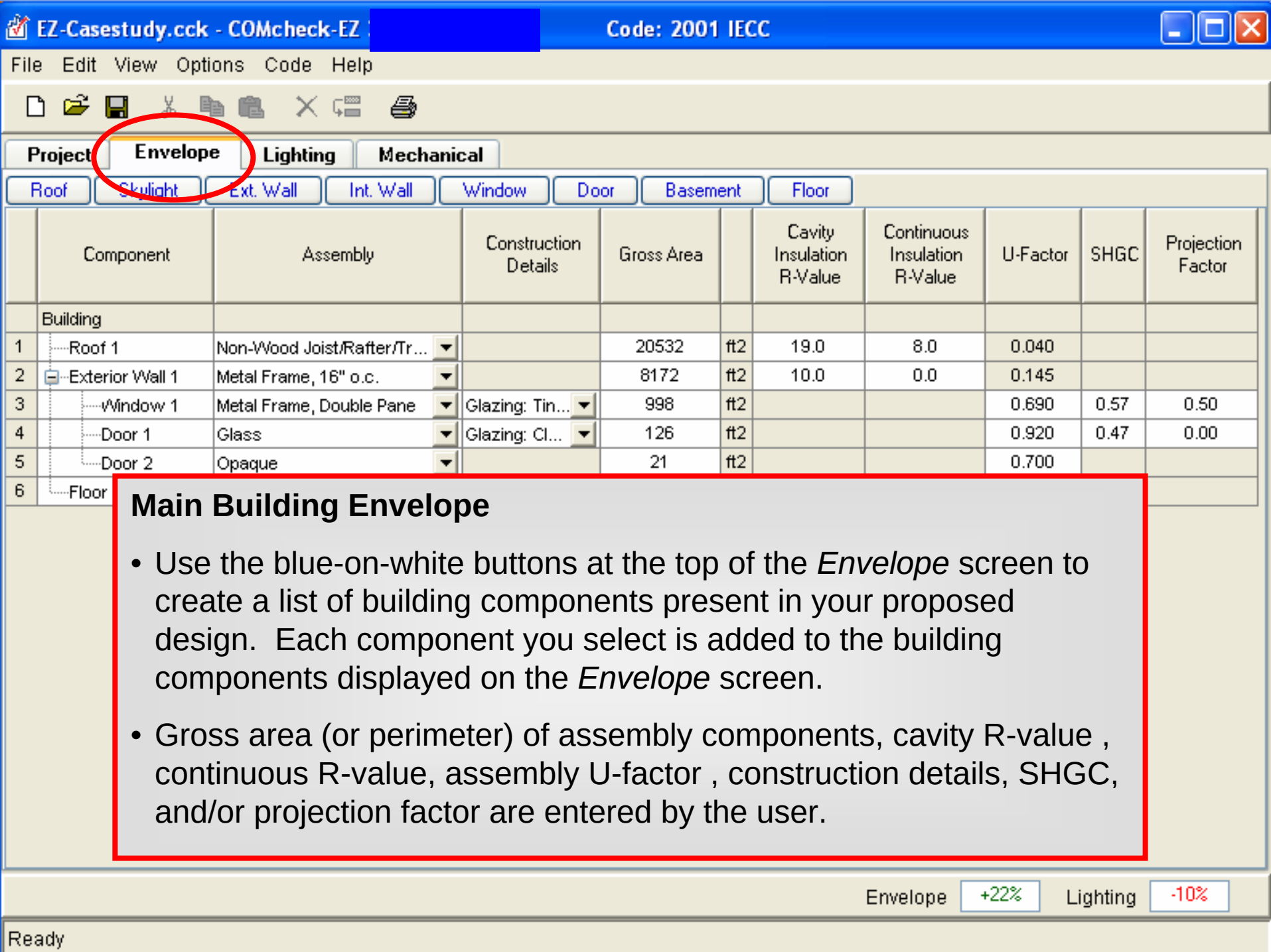
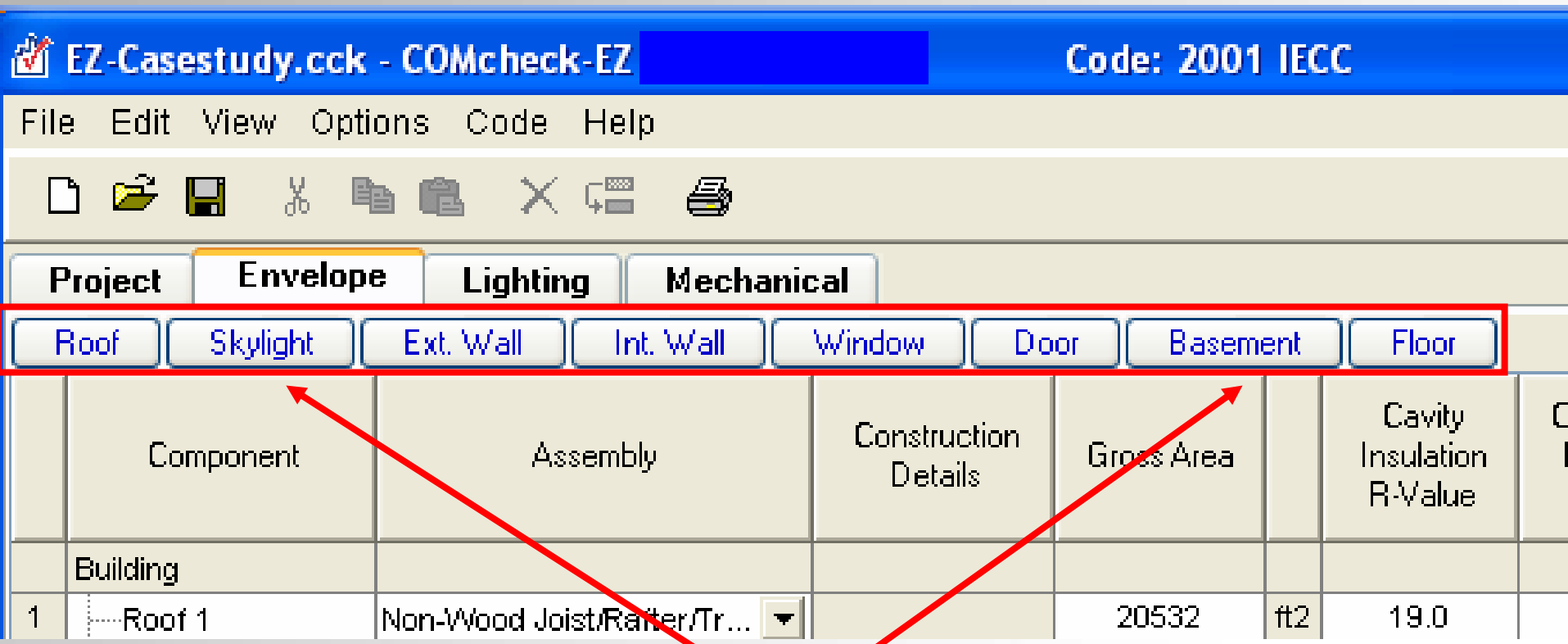
gn (existing fixturesand existing mechanical equipment.
Envelope +22% Lighting -10%
Choose the state in which the building will be located.

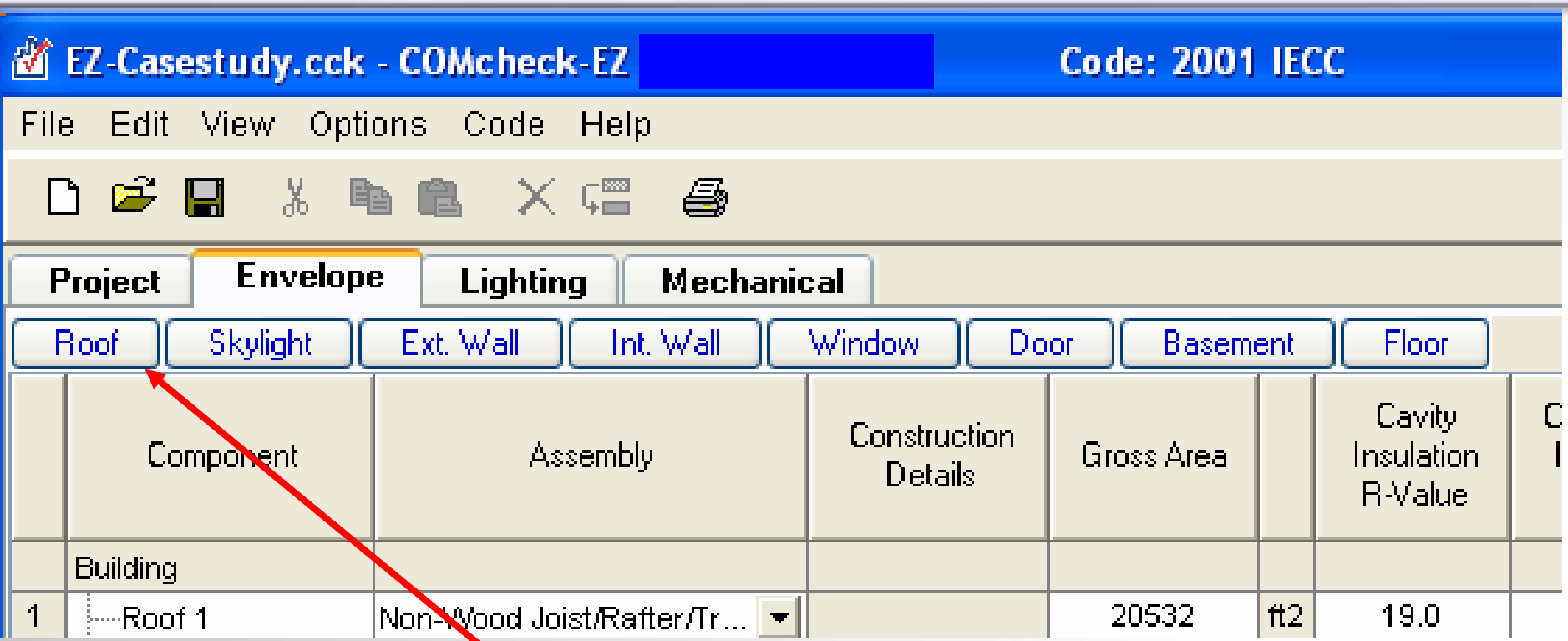

EZ-Casestudy.cck - COMcheck-EZ
Code: 2001 IECC
File Edit View Options Code Help
Project
Envelope
Lighting
Mechanical
Roof
Skylight
Ext. Wall
Int. Wall
Window
Door
Basement
Floor
Component
Assembly
Construction Details
Gross Area
Cavity Insulation R-Value
Continuous Insulation R-Value
U-Factor
SHGC
Projection Factor
Building
1 Roof 1 Non-Wood Joist/Rafter/Tr... 20532 ft2 19.0 8.0 0.040
2 Exterior Wall 1 Metal Frame, 16" o.c. 8172 ft2 10.0 0.0 0.145
3 Window 1 Metal Frame, Double Pane Glazing: Tin... 998 ft2 0.690 0.57 0.50
4 Door 1 Glass Glazing: Cl... 126 ft2 0.920 0.47 0.00
5 Door 2 Opaque 21 ft2 0.700
6 Floor
Main Building Envelope
• Use the blue-on-white buttons at the top of the Envelope screen to create a list of building components present in your proposed design. Each component you select is added to the building components displayed on the Envelope screen.
• Gross area (or perimeter) of assembly components, cavity R-value , continuous R-value, assembly U-factor , construction details, SHGC, and/or projection factor are entered by the user.
Envelope +22% Lighting -10%
Ready

Envelope Screen



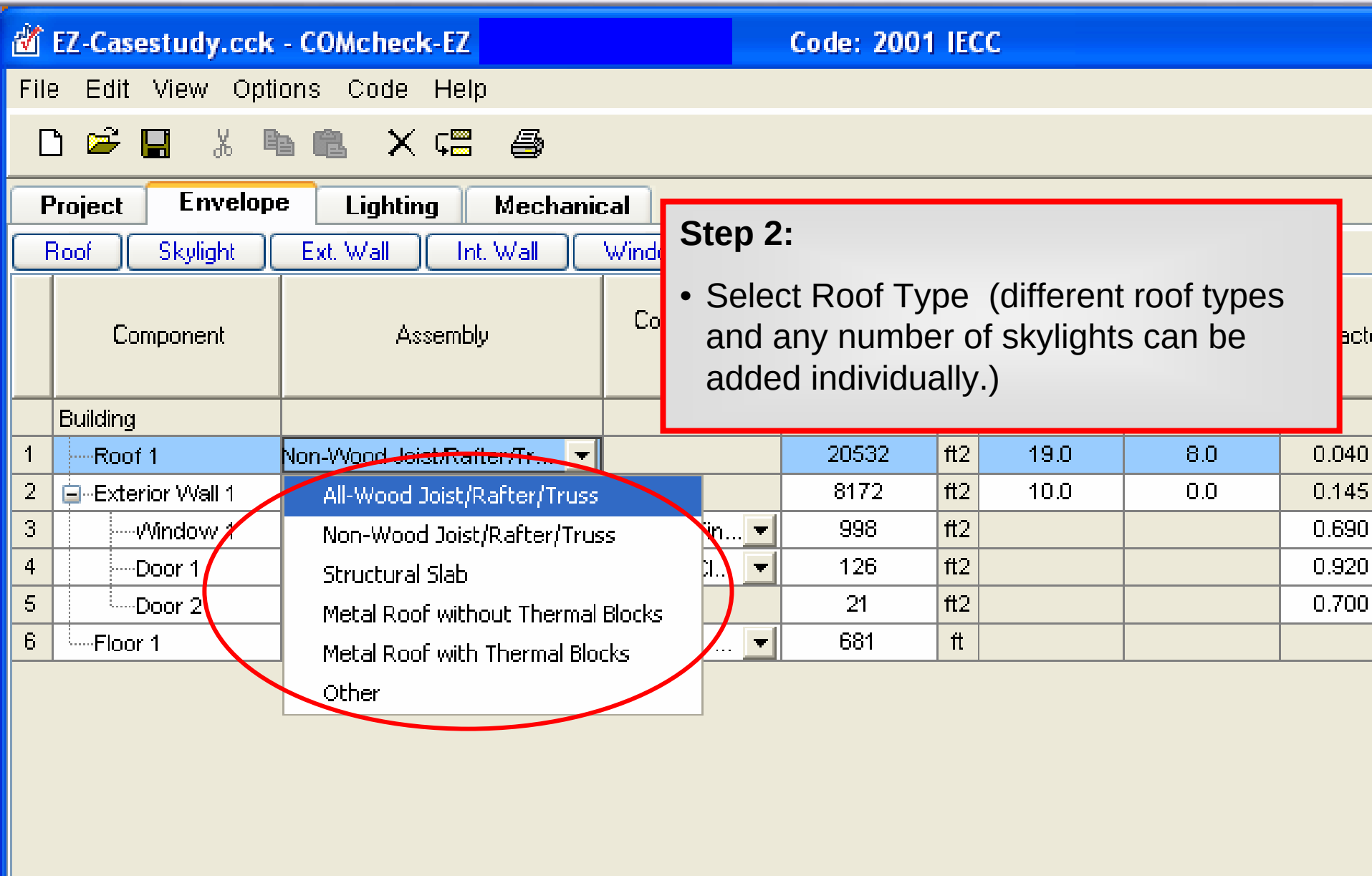
Building Components are added by clicking on these.

Adding Roofs – Step 1



Step 1: Click on Roof

Adding Roofs – Step 2



Adding Roofs – Step 3

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File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

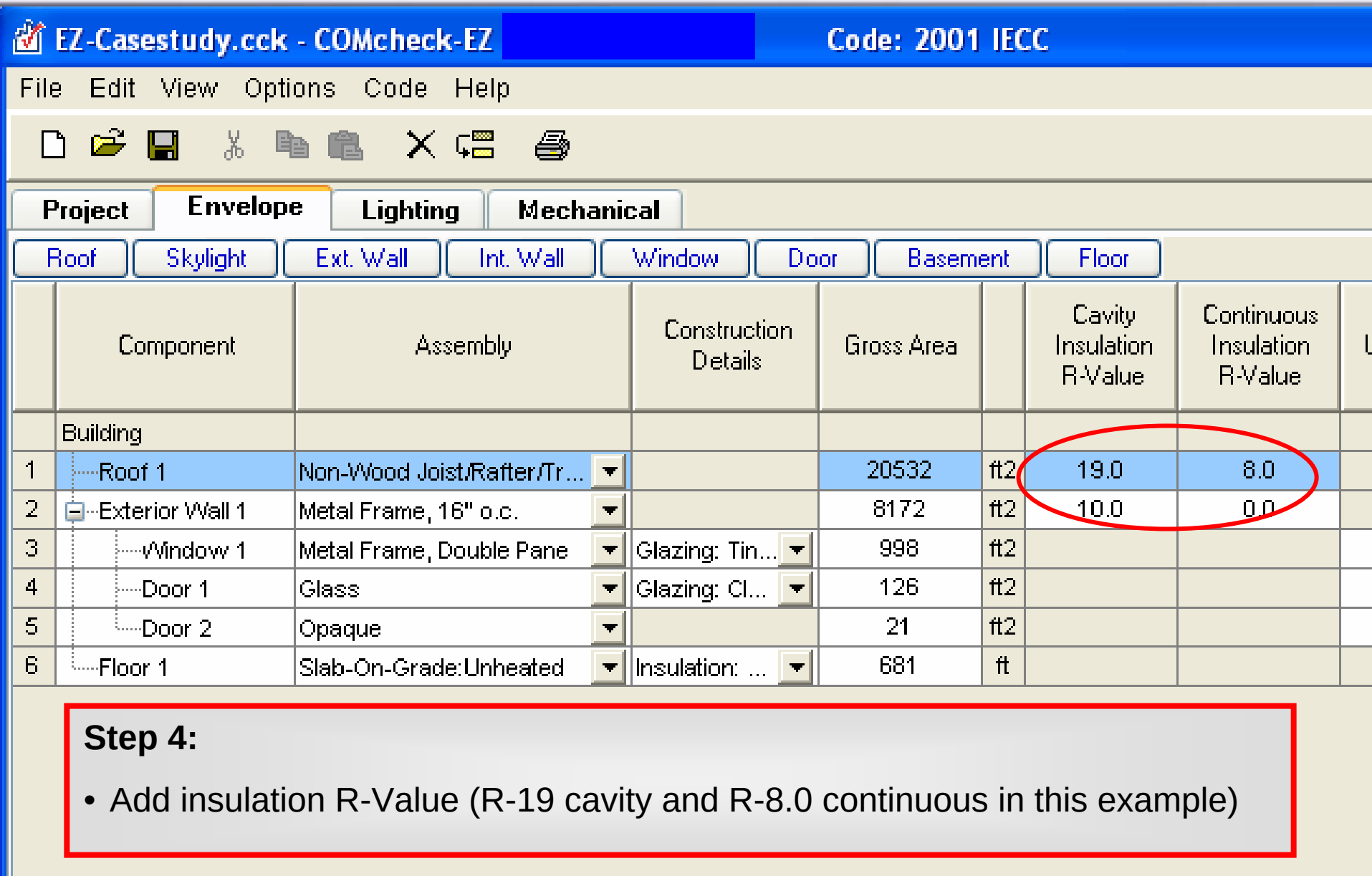
Roof | Skylight | Ext. Wall | Int. Wall | Window | Door | Basement | Floor

	Component	Assembly	Construction Details	Gross Area		Cavity Insulation R-Value	Continuous Insulation R-Value
	Building						
1	Roof 1	Non-Wood Joist/Rafter/Tr...		20532	ft2	19.0	8.0
2	Exterior Wall 1	Metal Frame, 16" o.c.		8172	ft2	10.0	0.0
3	Window 1	Metal Frame, Double Pane	Glazing: Tin...	998	ft2		
4	Door 1	Glass	Glazing: Cl...	126	ft2		
5	Door 2	Opaque		21	ft2		
6	Floor 1	Slab-On-Grade:Unheated	Insulation: ...	681	ft		

Step 3:

- Add square footage (In this case 20532 square feet)

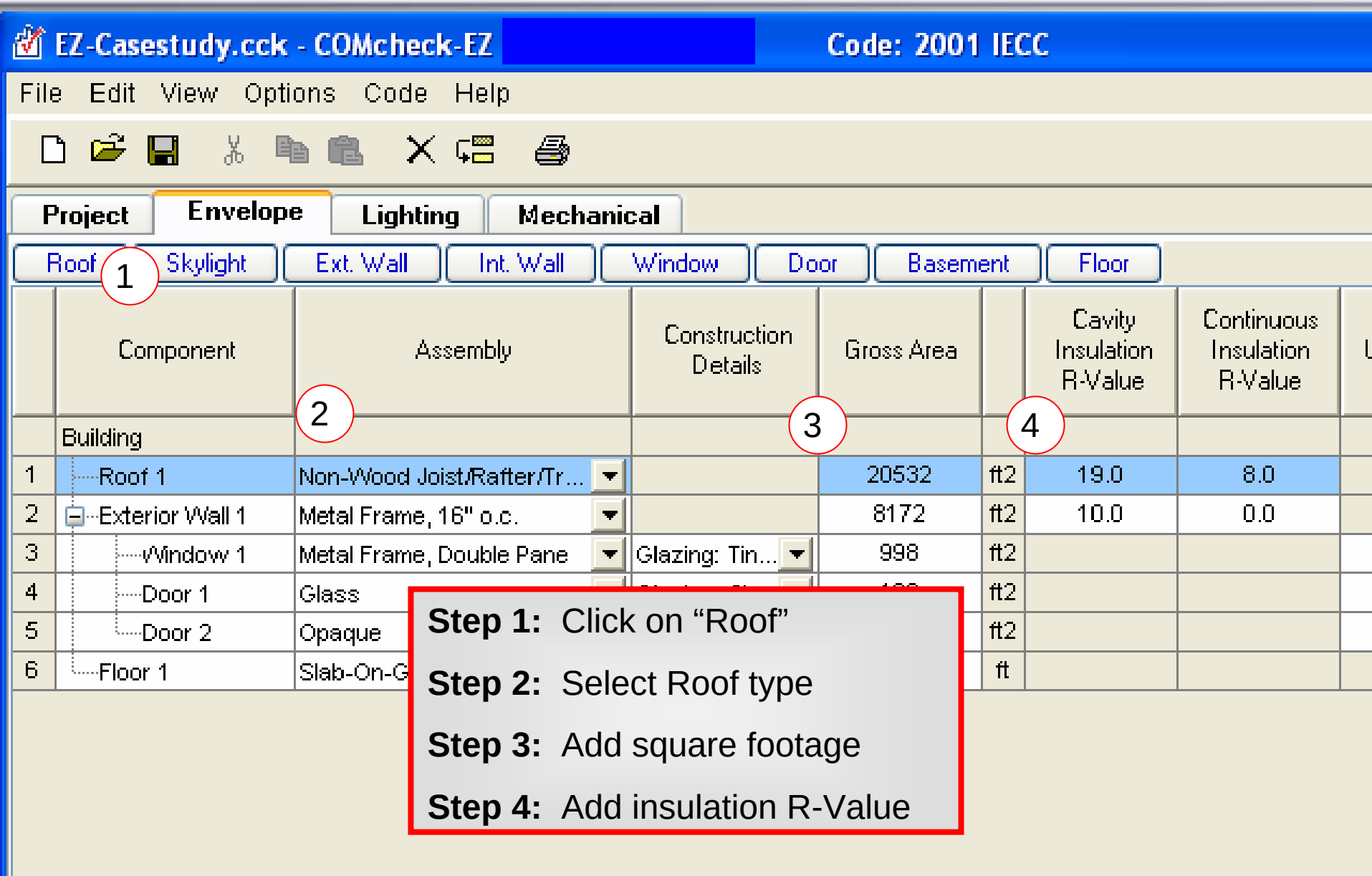
Adding Roofs – Step 4



Step 4:

- Add insulation R-Value (R-19 cavity and R-8.0 continuous in this example)

Adding Roofs



Skylights

- 3% of area is exempted from inclusion in the proposed and budget building loads calculations
  - Requirements based on
    - U-value (NFRC tested) or
    - Default U-value table

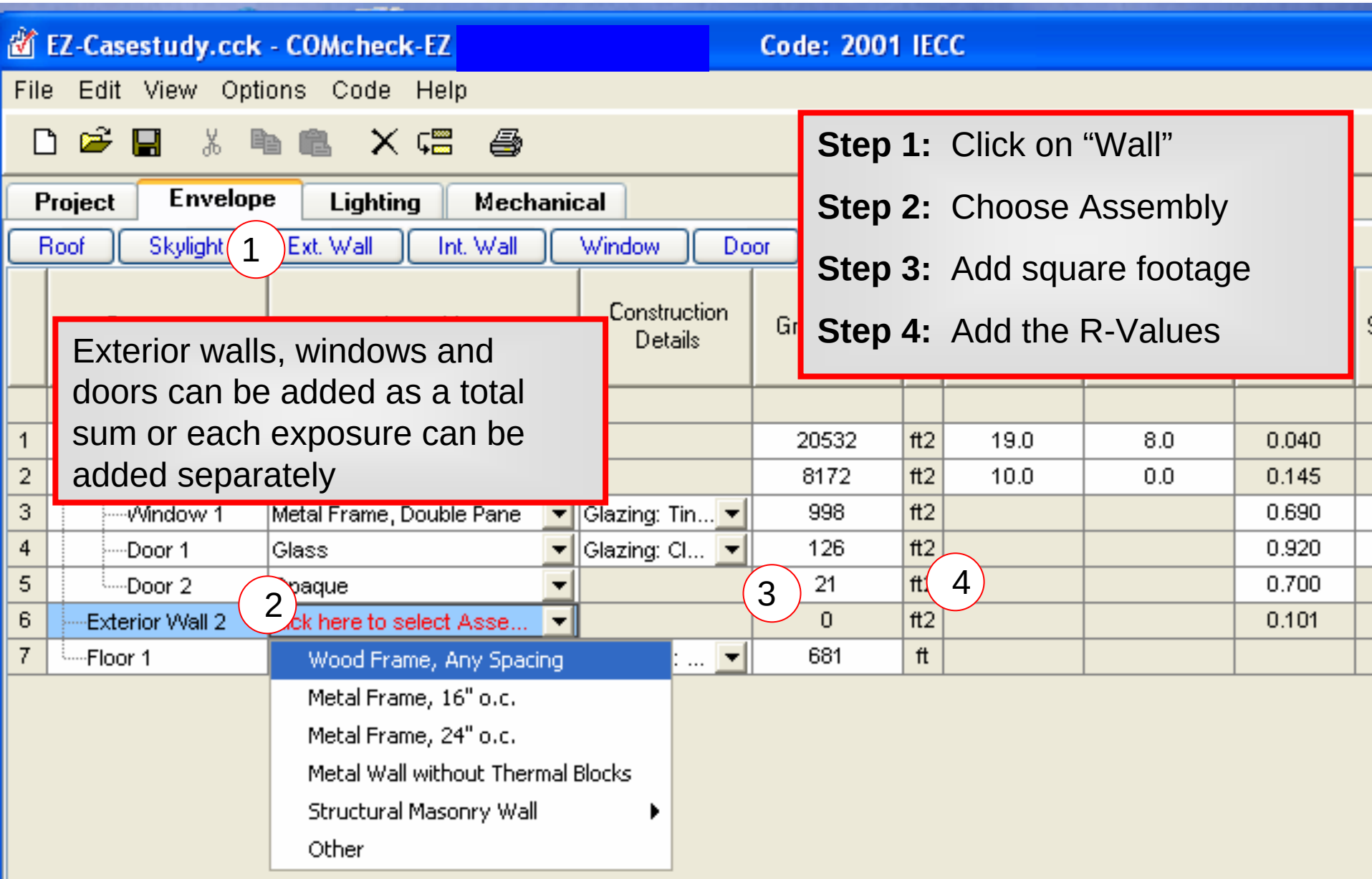
TABLE 102.3(1)
U-VALUE DEFAULT TABLE FOR WINDOWS, GLAZED DOORS AND SKYLIGHTS

FRAME MATERIAL AND PRODUCT TYPE[a]	SINGLE GLAZED	DOUBLE GLAZED
Metal without thermal break		
Operable (including sliding and swinging glass doors)	1.27	0.87
Fixed	1.13	0.69
Garden window	2.60	1.81
Curtain wall	1.22	0.79
Skylight	1.98	1.31
Site-assembled sloped/overhead glazing	1.36	0.82
Metal with thermal break		
Operable (including sliding and swinging glass doors)	1.08	0.65
Fixed	1.07	0.63
Curtain wall	1.11	0.68
Skylight	1.89	1.11
Site-assembled sloped/overhead glazing	1.25	0.70
Reinforced vinyl/metal clad wood		
Operable (including sliding and swinging glass doors)	0.90	0.57
Fixed	0.98	0.56
Skylight	1.75	1.05
Wood/vinyl/fiberglass		
Operable (including sliding and swinging glass doors)	0.89	0.55
Fixed	0.98	0.56
Garden window	2.31	1.61
Skylight	1.47	0.84

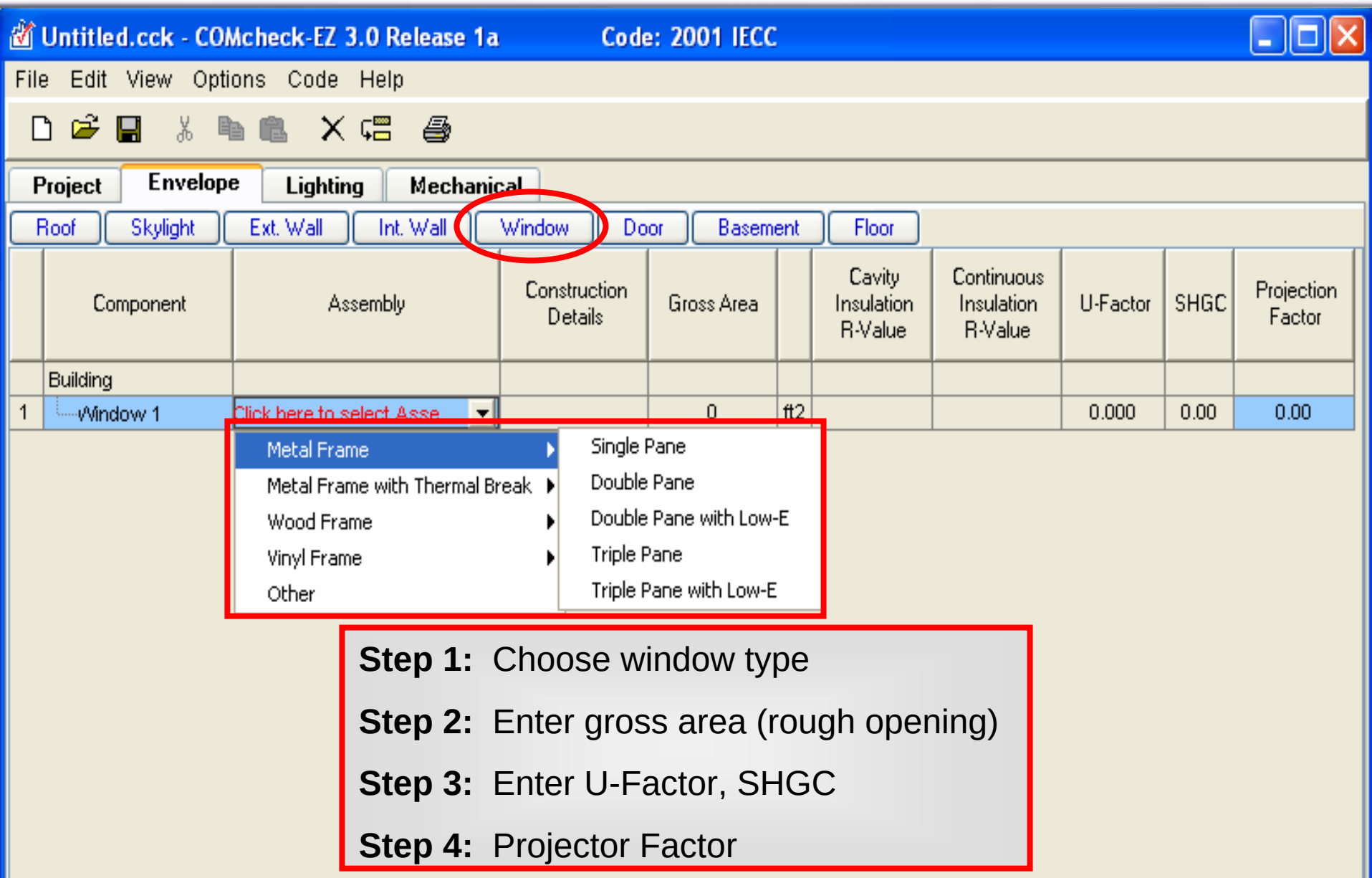
For SI: 1 inch = 25.4 mm.

[a] Glass block assemblies with mortar but without reinforcing or framing shall have a *U*-value of 0.60.

Adding Exterior Walls



Adding Windows



Step 1: Choose window type

Step 2: Enter gross area (rough opening)

Step 3: Enter U-Factor, SHGC

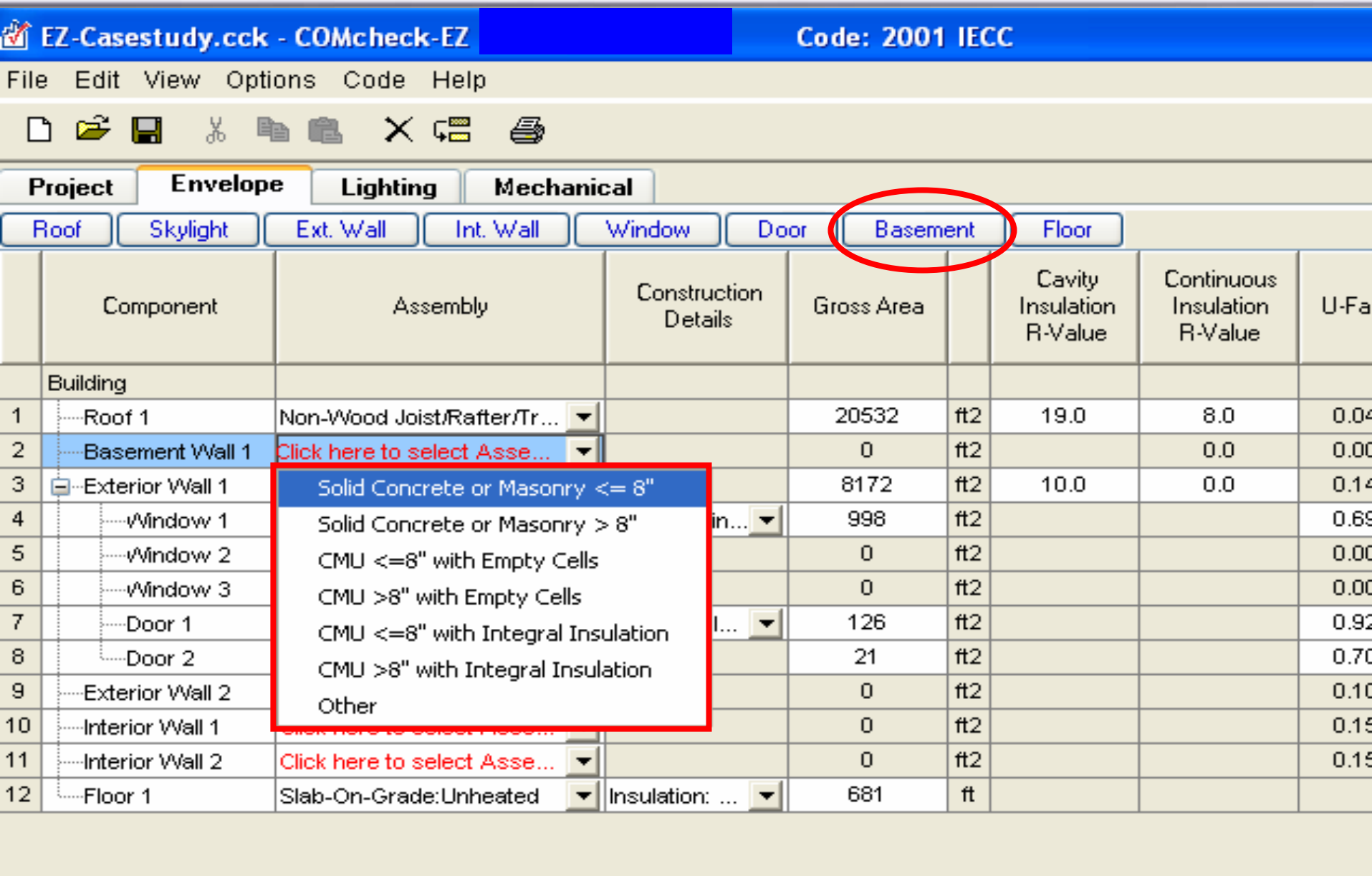
Step 4: Projector Factor

Windows – U-Factors

Table 102.3(1) U-Value Default For Windows Glazed Doors and Skylights		
Frame Material and Product Type	Single Glazed	Double Glazed
Metal without thermal break		
Operable (including Sliding and swinging glass door)	1.27	0.87
Fixed	1.13	0.69
Garden Window	2.60	1.81
Curtain Wall	1.22	0.79
Skylight	1.98	1.31
Site-assembled Sloped/overhead glazing	1.36	0.82
Metal with thermal break		
Operable (including Sliding and swinging glass door)		
Fixed	1.08	0.65
Garden Window	1.07	0.63
Curtain Wall	1.11	0.68
Skylight	1.89	1.11
Site-assembled Sloped/overhead glazing	1.25	0.70
Reinforced vinyl/metal clad wood		
Operable (including sliding and swinging glass doors)	0.90	0.57
Fixed	0.98	0.56
Skylights	1.75	1.05
Wood/vinyl/fiberglass		
Operable (including sliding and swinging glass doors)	0.89	0.55
Fixed	0.98	0.56
Garden Window	2.31	1.61
Skylight	1.47	0.84

- NFRC tested and certified or default window U-value range
- Use assembly U-value
- All windows must meet or exceed

Basement Walls



Basement Walls

Basement Walls

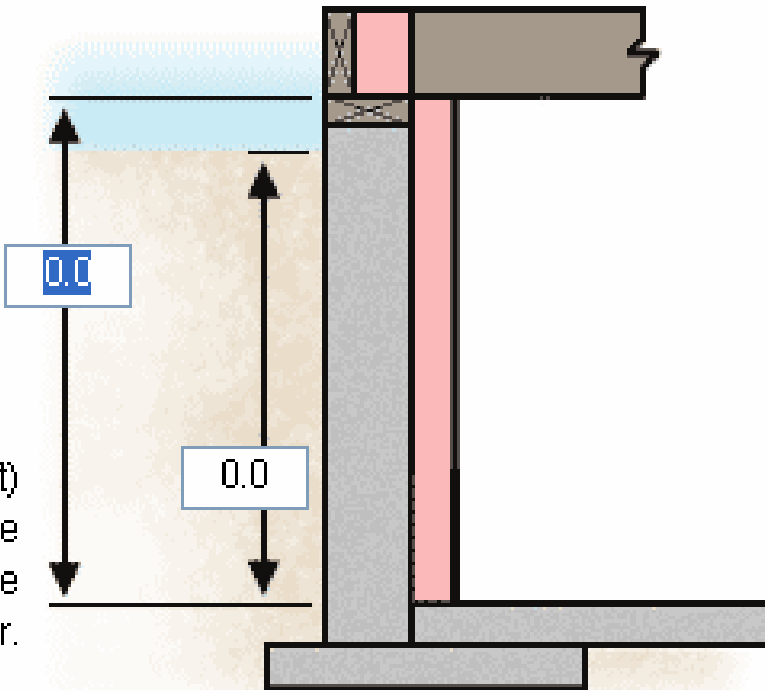
Enter the specified dimensions in feet (not inches) in the boxes provided.
Basement walls are walls that are partially or fully below grade.
Ignore portions of walls that are more than 10 ft below grade.

1 Wall Height (ft)
Measured from the top of the wall to the basement floor.

0.0

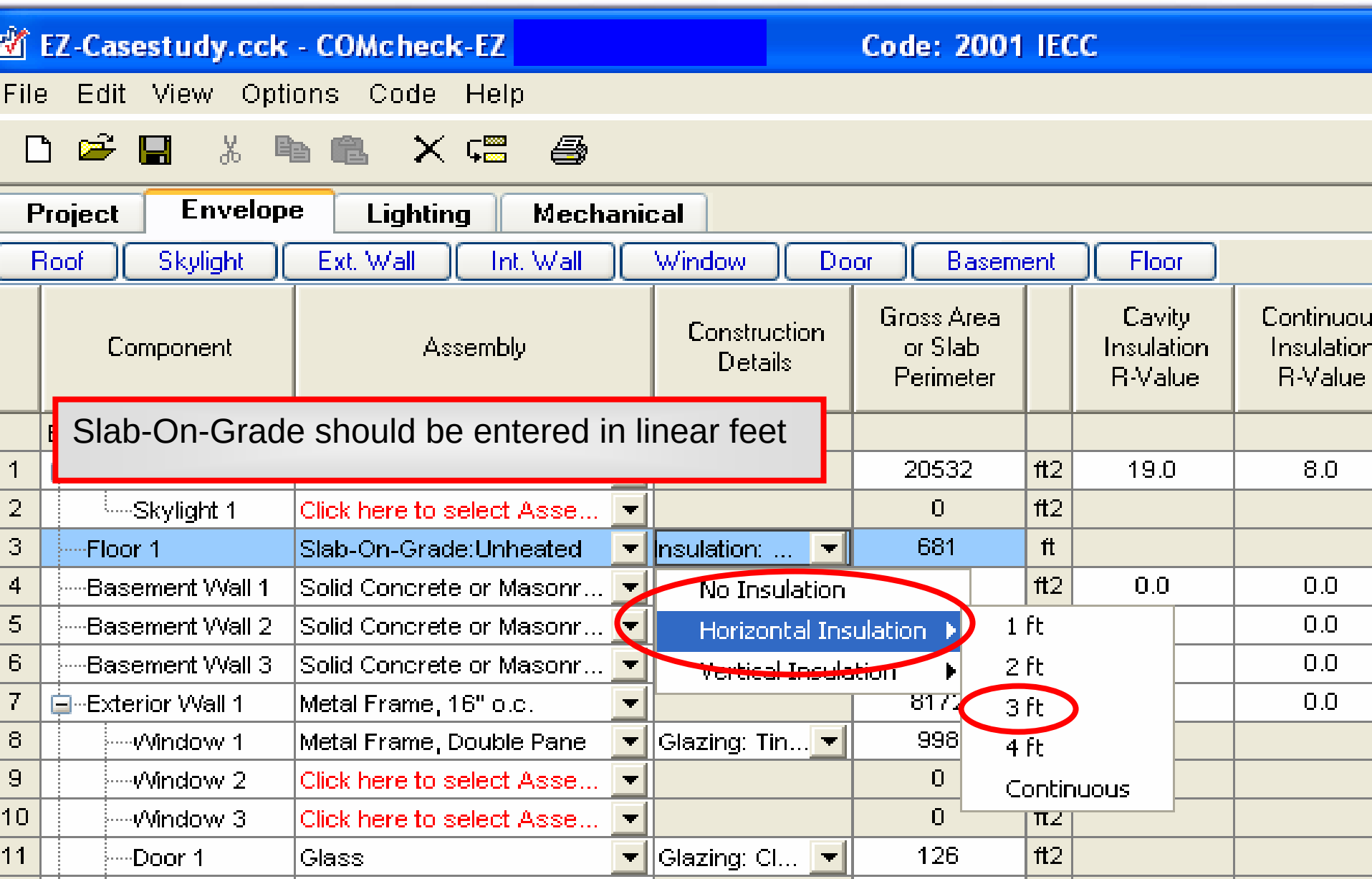
2 Depth Below Grade (ft)
Measured from the finished outside grade to the basement floor.

0.0



OK Cancel

Adding Floors



Untitled.cck - COMcheck-EZ Code: 2003 IECC

File Edit View Options Code Help

Project | Envelope | Lighting | Mechanical

Roof | Skylight | Ext. Wall | Int. Wall | Window | Door | Basement | Floor

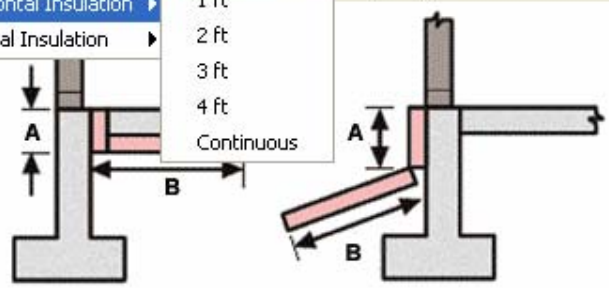
	Component	Assembly
	Building	
1	Floor 1	Slab-On-Grade:Unheated

Slab-On-Grade Floors

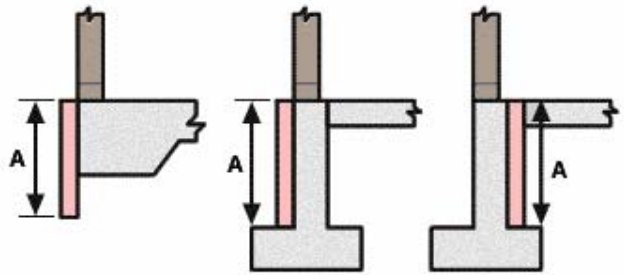
Construction Details... | Insulation:

- No Insulation
- Horizontal Insulation ▸
  - 1 ft
  - 2 ft
  - 3 ft
  - 4 ft
  - Continuous
- Vertical Insulation ▸

tion position and depth (ft.):



Horizontal Insulation (A + B = Insulation Depth)
(If A > B, Enter As Vertical Insulation)



Vertical Insulation (A = Insulation Depth)

OK | Cancel

Valid building use area(s) must be provided on the Project screen.

Envelope TBD | Lighting TBD

Click the Assembly fields to display a list of assembly choices. "Other" assembly types are editable.

Interior Lighting Compliance

Mandatory Requirements

- Controls
- Switching

and

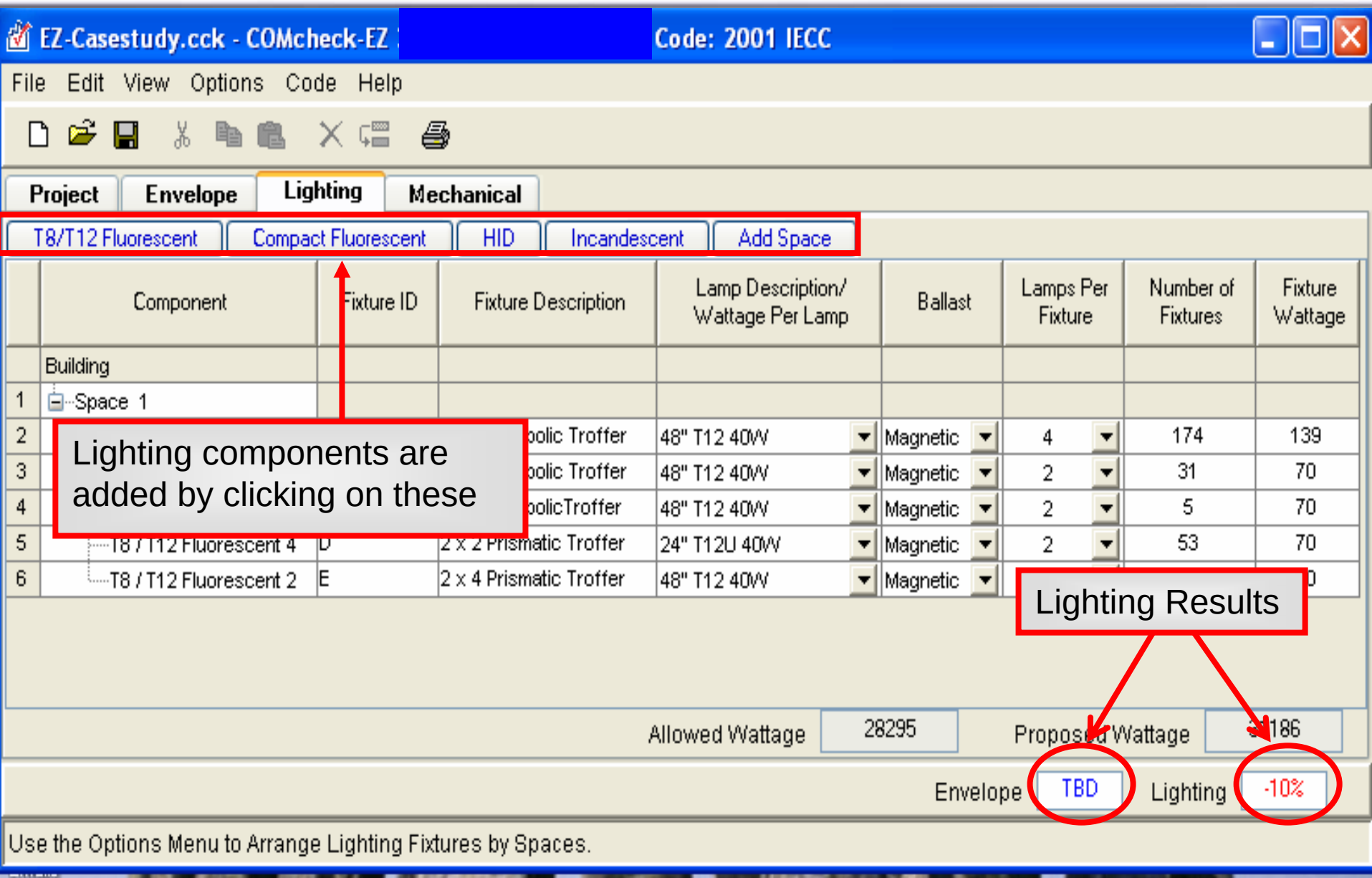
Interior Lighting Power Requirements

The building complies if its total connected power is no greater than the interior lighting power

Total Connected Power (805.4.1) **<** **Interior Lighting Power (805.4.2)**

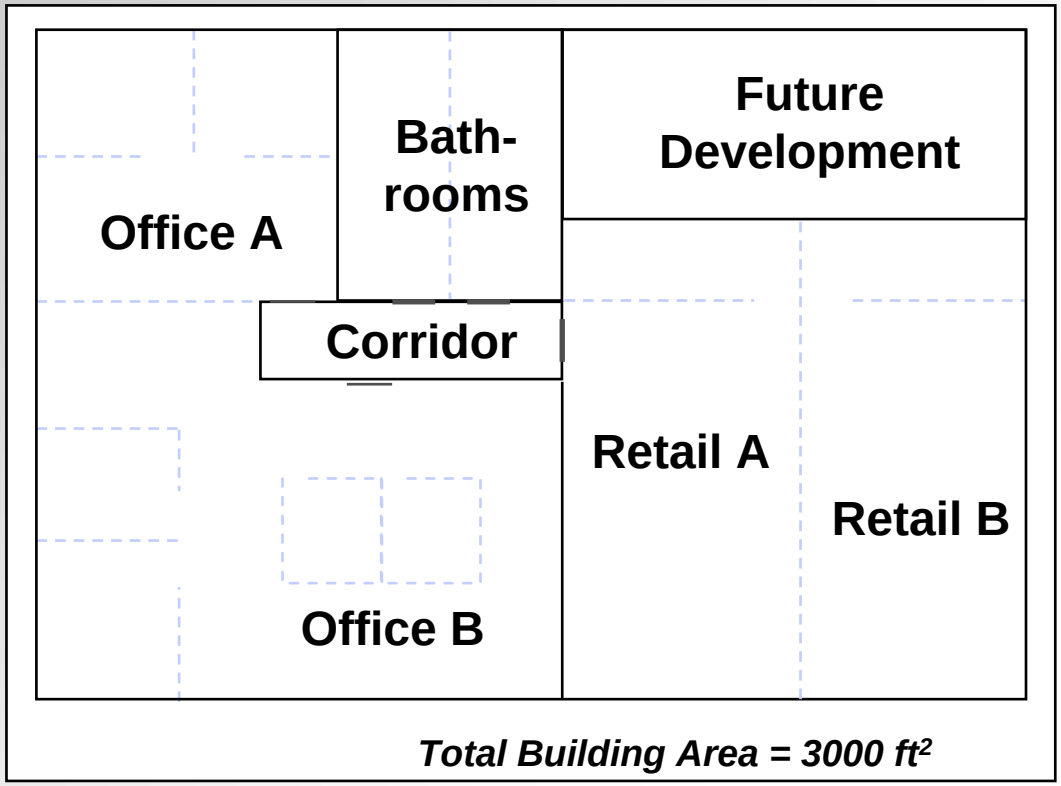
- Entire Building
- Partial Building

Adding Lighting

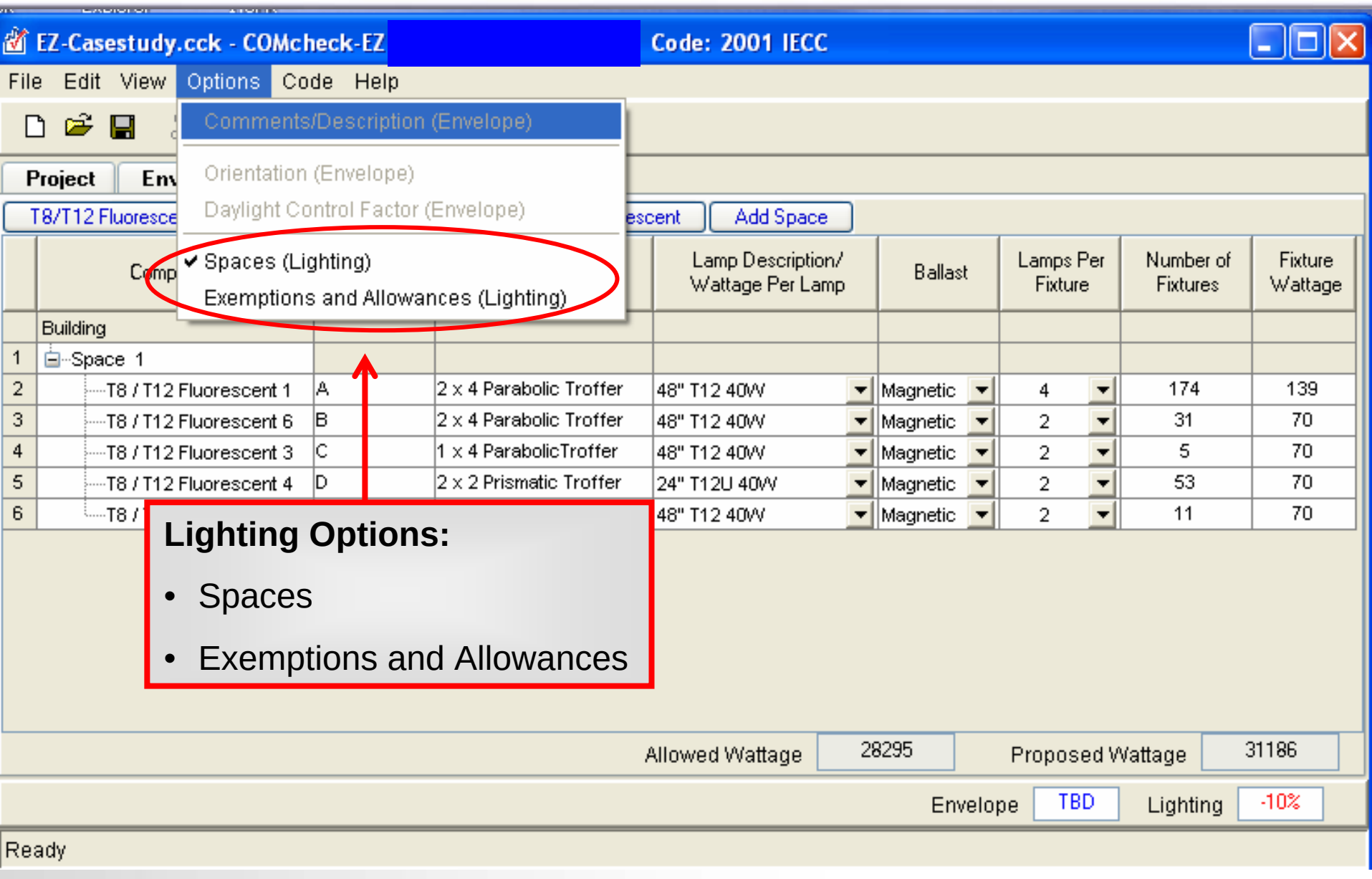


Lighting Using Space-by-Space

Office A:	400 ft^2
Office B:	850 ft^2
Bathrooms:	350 ft^2
Corridor:	50 ft^2
Retail A:	500 ft^2
Retail B:	500 ft^2
Future:	350 ft^2

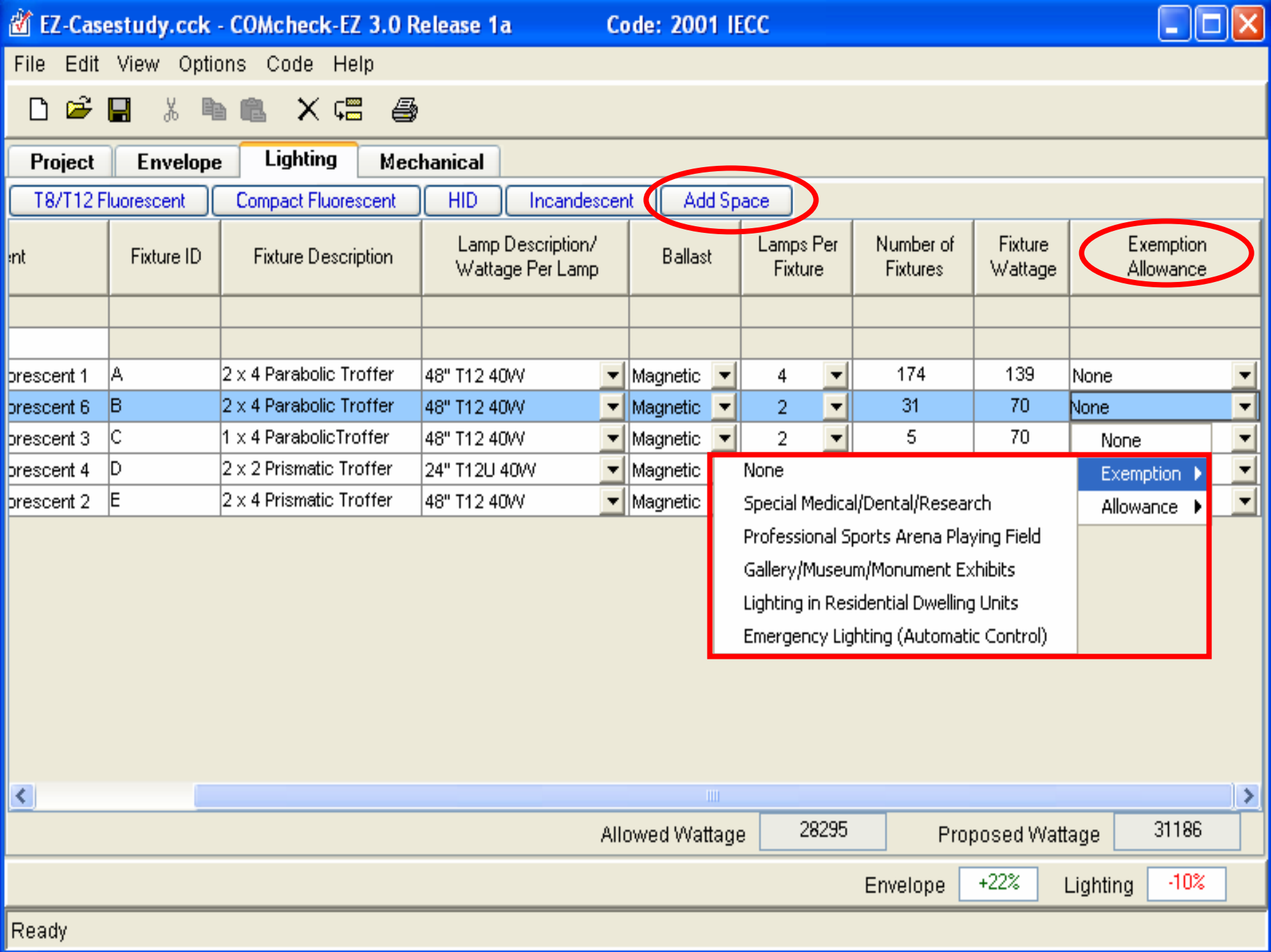


Lighting Options



Lighting Options:

- Spaces
- Exemptions and Allowances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Project Envelope Lighting Mechanical
T8/T12 Fluorescent
Compact Fluorescent
HID
Incandescent
Add Space
nt
Fixture ID
Fixture Description
Lamp Description/ Wattage Per Lamp
Ballast
Lamps Per Fixture
Number of Fixtures
Fixture Wattage
Exemption Allowance
prescent 1 A 2 x 4 Parabolic Troffer 48" T12 40W Magnetic 4 174 139 None
prescent 6 B 2 x 4 Parabolic Troffer 48" T12 40W Magnetic 2 31 70 None
prescent 3 C 1 x 4 ParabolicTroffer 48" T12 40W Magnetic 2 5 70 None
prescent 4 D 2 x 2 Prismatic Troffer 24" T12U 40W Magnetic
prescent 2 E 2 x 4 Prismatic Troffer 48" T12 40W Magnetic
None
Special Medical/Dental/Research
Professional Sports Arena Playing Field
Gallery/Museum/Monument Exhibits
Lighting in Residential Dwelling Units
Emergency Lighting (Automatic Control)
Exemption
Allowance
Allowed Wattage 28295
Proposed Wattage 31186
Envelope +22%
Lighting -10%
Ready

Mechanical Requirements

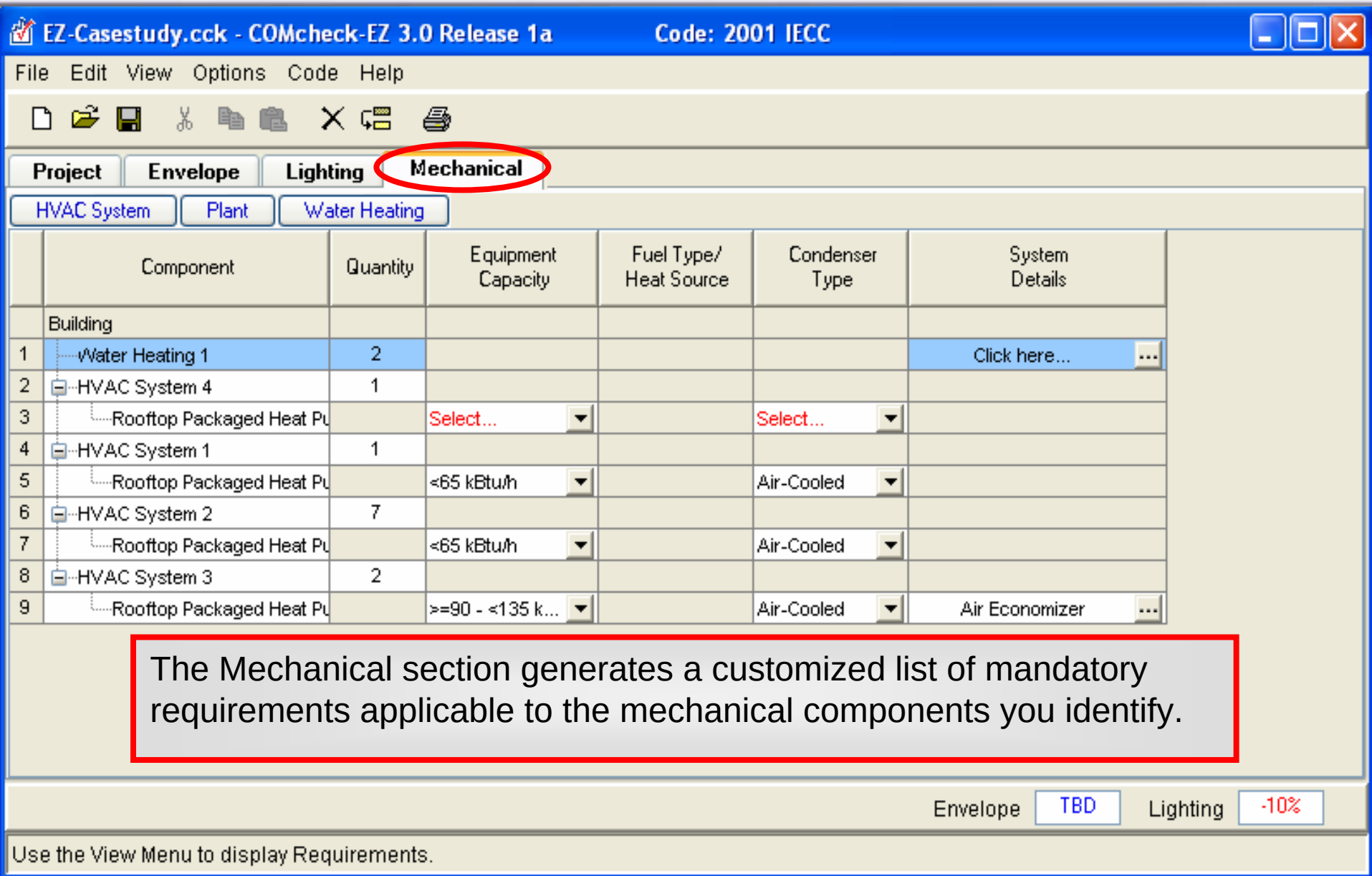
Simple Systems (Section 803.2)

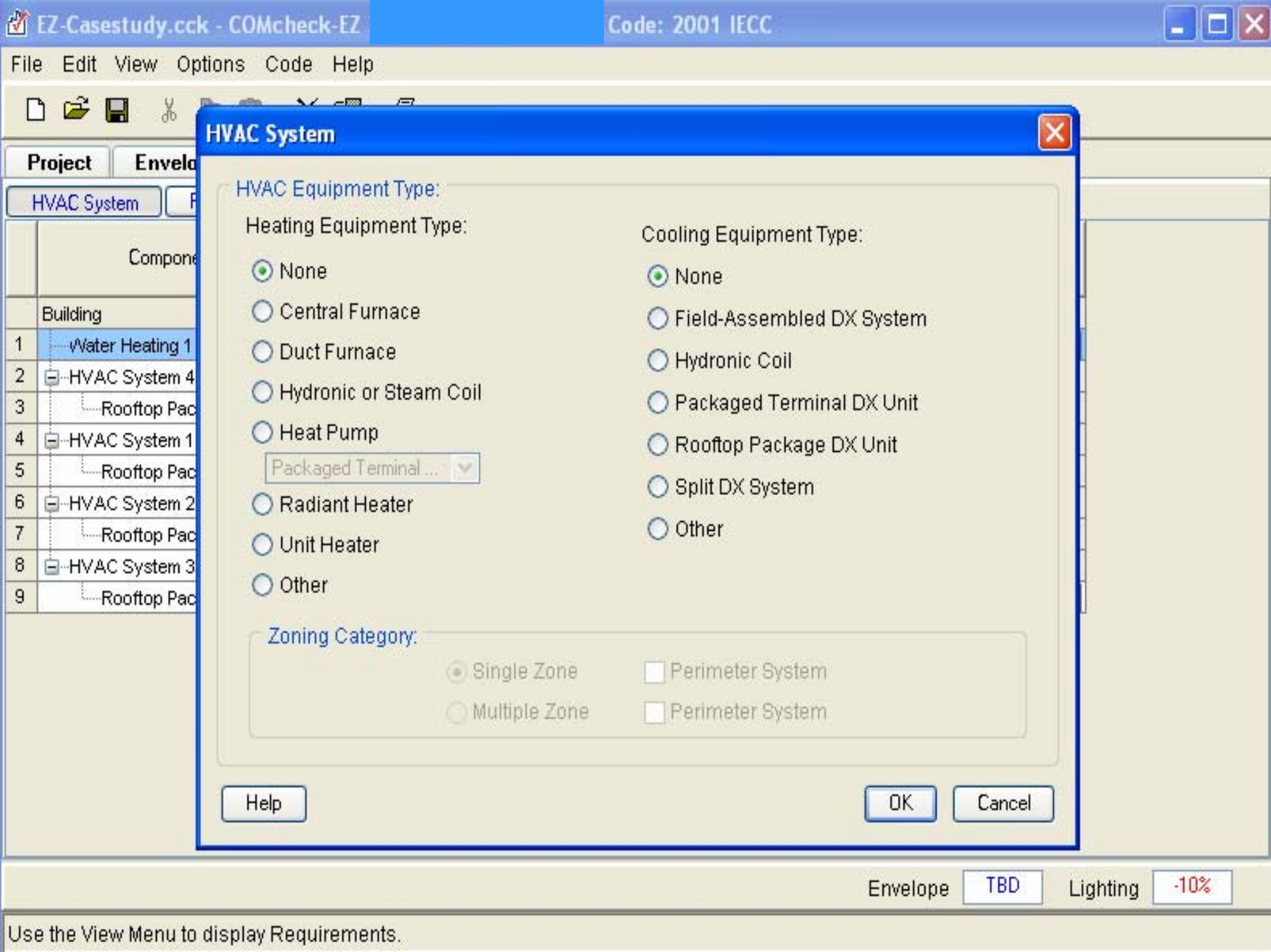
- 803.2.1 - Heating and cooling loads
- 803.2.2 - HVAC Equipment Performance Requirement
- 803.2.3 -Temperature & Humidity Controls
- 803.2.4 - Hydronic System Controls
- 803.2.5 - Ventilation
- 803.2.6 - Economizers
- 803.2.7 - Shutoff Damper Controls
- 803.2.8 - Duct and Plenum Insulation and Sealing
- 803.2.9 - Piping insulation

Complex Systems (Section 803.3)

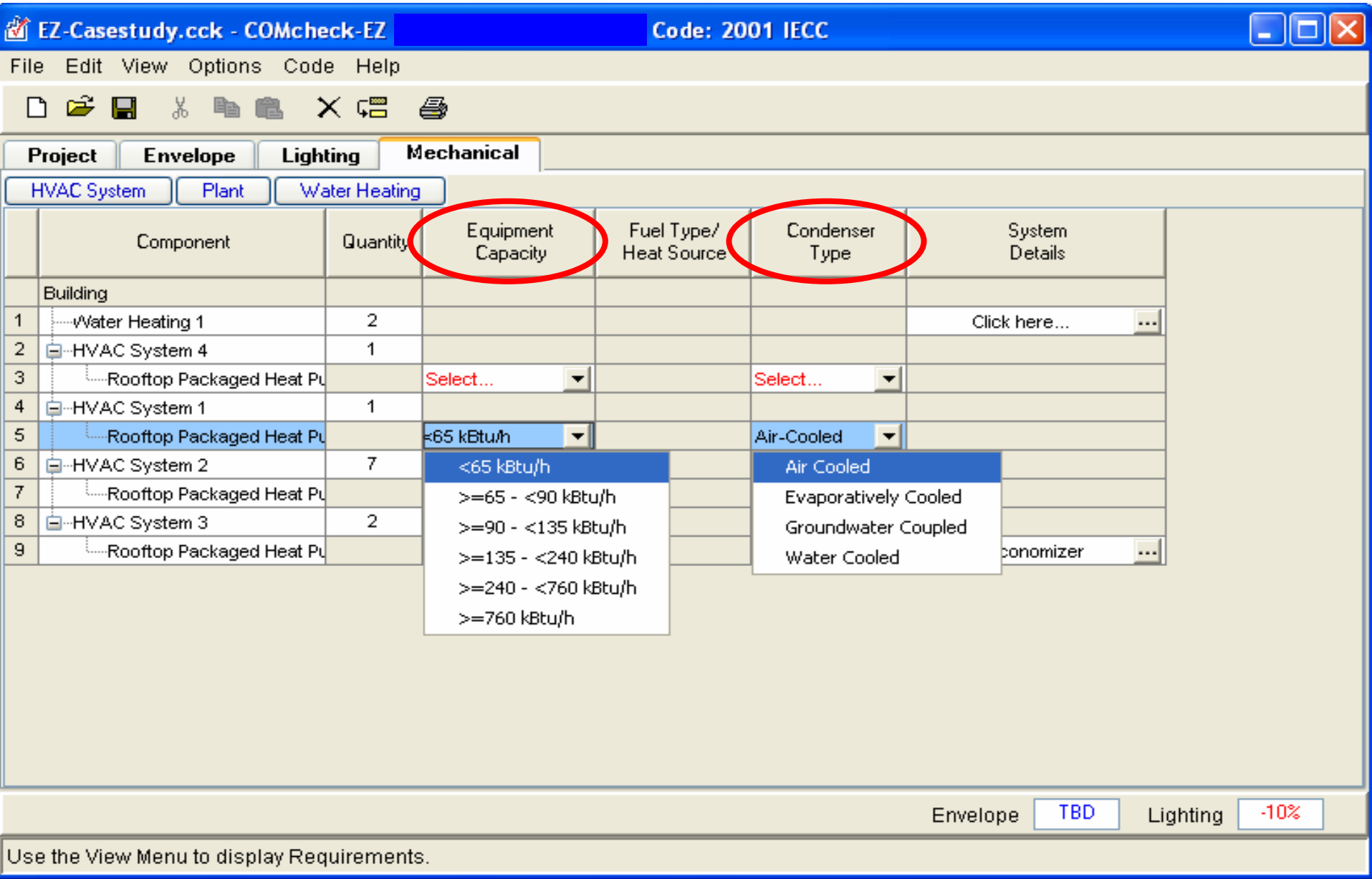
- 803.3.1 - Heating and Cooling Loads
- 803.3.2 - HVAC Equipment Performance Requirement
- 803.3.3 –HVAC System Controls
- 803.3.4 – VAV Systems Serving Multiple Zones
- 803.3.5 - Ventilation
- 803.3.6 - Duct and Plenum Insulation and Sealing
- 803.3.7 - Piping insulation
- 803.3.8 – System Completion

Mechanical


EZ-Casestudy.cck - COMcheck-EZ 3.0 Release 1a
Code: 2001 IECC
File Edit View Options Code Help
Project Envelope Lighting Mechanical
HVAC System Plant Water Heating
Component | Quantity | Equipment Capacity | Fuel Type/ Heat Source | Condenser Type | System Details
Building
1 Water Heating 1 | 2 | | | | Click here...
2 HVAC System 4 | 1 | | | |
3 Rooftop Packaged Heat Pu | | Select... | | Select... |
4 HVAC System 1 | 1 | | | |
5 Rooftop Packaged Heat Pu | | <65 kBtu/h | | Air-Cooled |
6 HVAC System 2 | 7 | | | |
7 Rooftop Packaged Heat Pu | | <65 kBtu/h | | Air-Cooled |
8 HVAC System 3 | 2 | | | |
9 Rooftop Packaged Heat Pu | | >=90 - <135 k... | | Air-Cooled | Air Economizer
The Mechanical section generates a customized list of mandatory requirements applicable to the mechanical components you identify.
Envelope TBD Lighting -10%
Use the View Menu to display Requirements.


EZ-Casestudy.cck - COMcheck-EZ
Code: 2001 IECC
File Edit View Options Code Help
Project
HVAC System
Building
1 Water Heating 1
2 HVAC System 4
3 Rooftop Pac
4 HVAC System 1
5 Rooftop Pac
6 HVAC System 2
7 Rooftop Pac
8 HVAC System 3
9 Rooftop Pac
HVAC System
HVAC Equipment Type:
Heating Equipment Type:
None
Central Furnace
Duct Furnace
Hydronic or Steam Coil
Heat Pump
Packaged Terminal ...
Radiant Heater
Unit Heater
Other
Cooling Equipment Type:
None
Field-Assembled DX System
Hydronic Coil
Packaged Terminal DX Unit
Rooftop Package DX Unit
Split DX System
Other
Zoning Category:
Single Zone
Perimeter System
Multiple Zone
Perimeter System
Help
OK
Cancel
Envelope TBD
Lighting -10%
Use the View Menu to display Requirements.

Mechanical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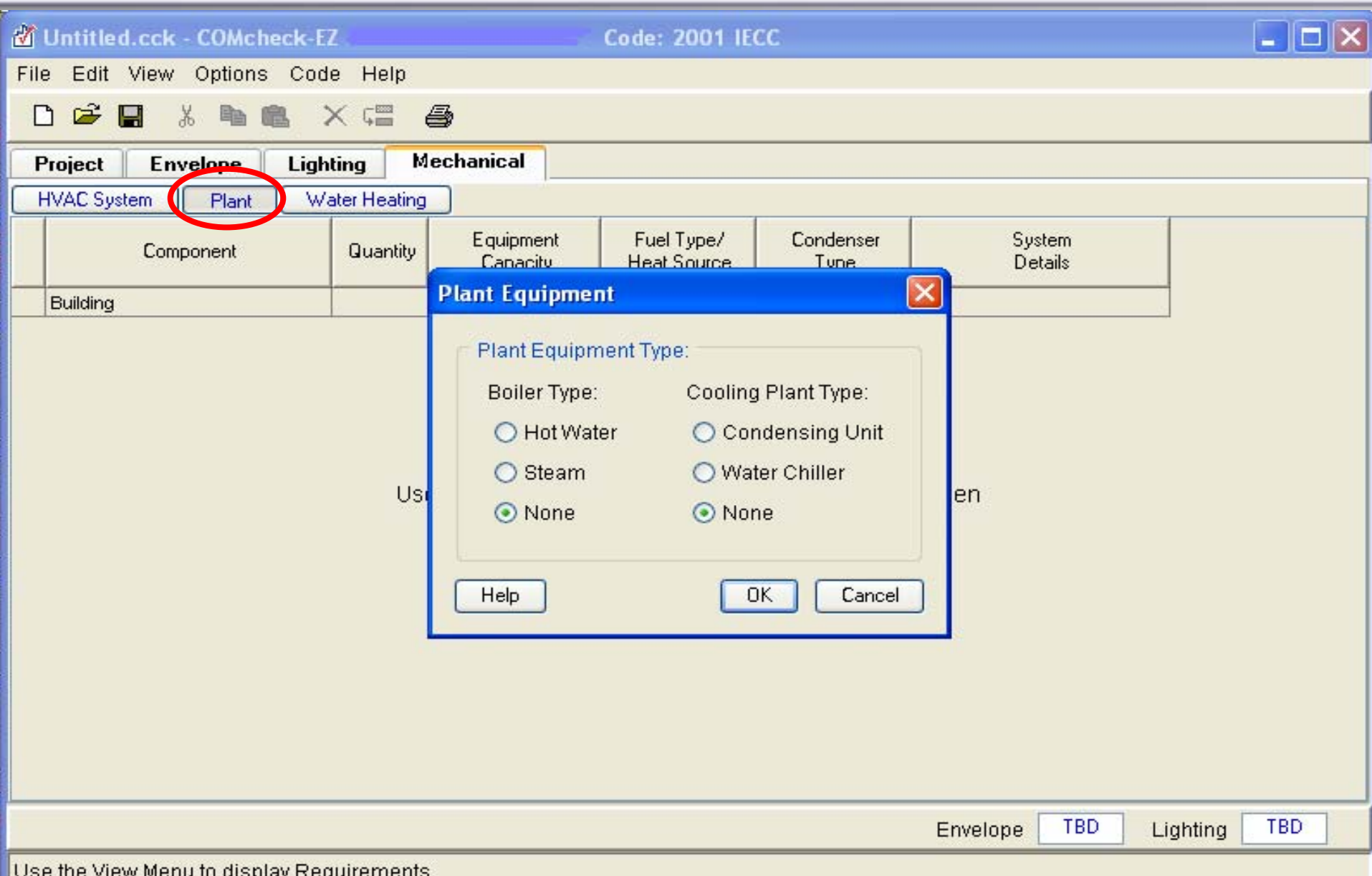
Code: 2001 IECC
File Edit View Options Code Help
Project Envelope Lighting Mechanical
HVAC System Plant Water Heating
Component
Quantity
Equipment Capacity
Fuel Type/ Heat Source
Condenser Type
System Details
Building
1 Water Heating 1 2 Click here...
2 HVAC System 4 1
3 Rooftop Packaged Heat Pu Select... Select...
4 HVAC System 1 1
5 Rooftop Packaged Heat Pu ≤65 kBtu/h Air-Cooled
6 HVAC System 2 7
7 Rooftop Packaged Heat Pu
8 HVAC System 3 2
9 Rooftop Packaged Heat Pu
<65 kBtu/h
>=65 - <90 kBtu/h
>=90 - <135 kBtu/h
>=135 - <240 kBtu/h
>=240 - <760 kBtu/h
>=760 kBtu/h
Air Cooled
Evaporatively Cooled
Groundwater Coupled
Water Cooled
conomizer
Envelope TBD Lighting -10%
Use the View Menu to display Requirements.

Mechanical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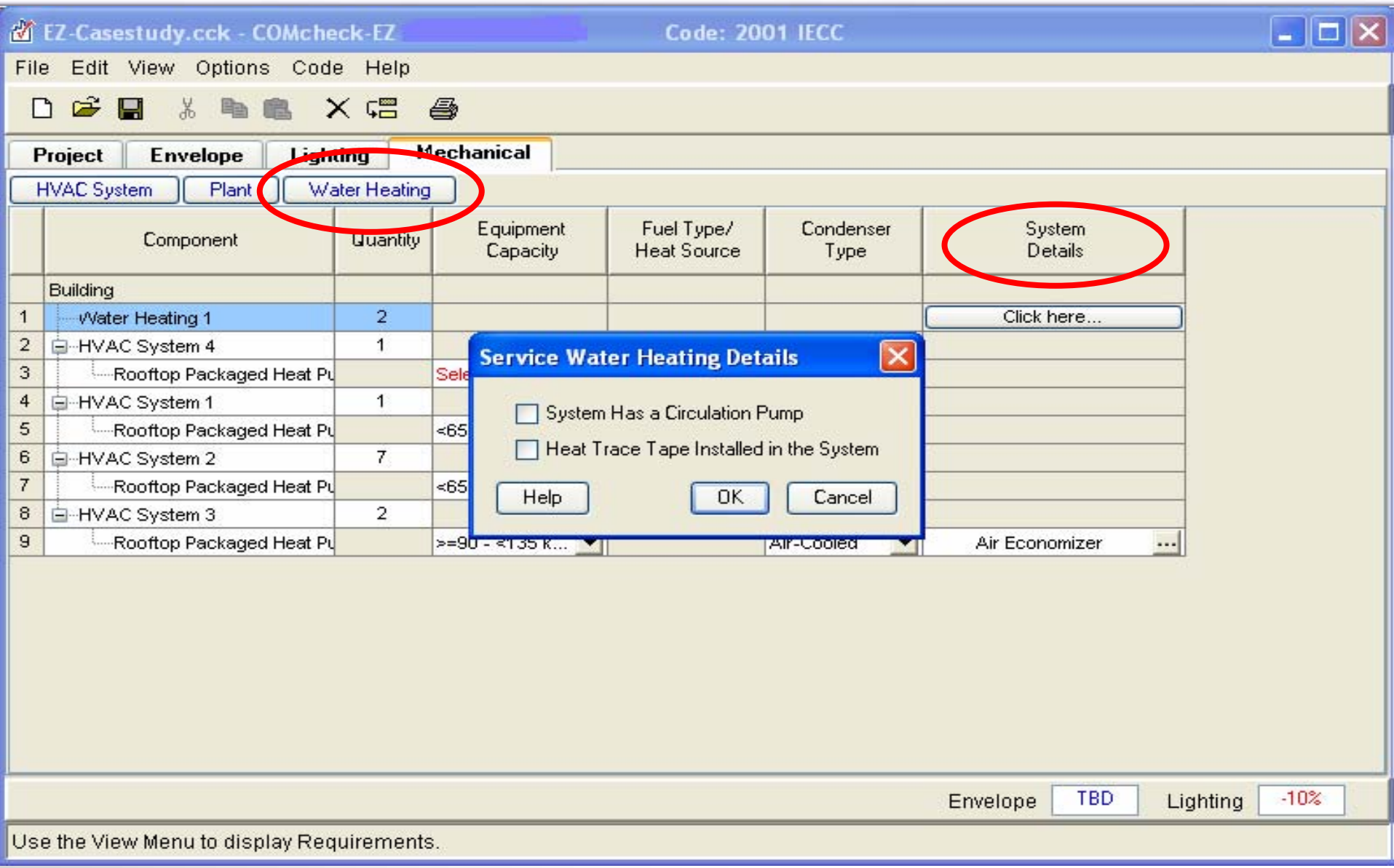
File Edit View Options Code Help
Project Envelope Lighting Mechanical
HVAC System Plant Water Heating
Component
Quantity
Equipment Capacity
Fuel Type/ Heat Source
Condenser Type
System Details
Building
Plant Equipment
Plant Equipment Type:
Boiler Type:
Hot Water
Steam
None
Cooling Plant Type:
Condensing Unit
Water Chiller
None
Help
OK
Cancel
Envelope TBD
Lighting TBD
Use the View Menu to display Requirements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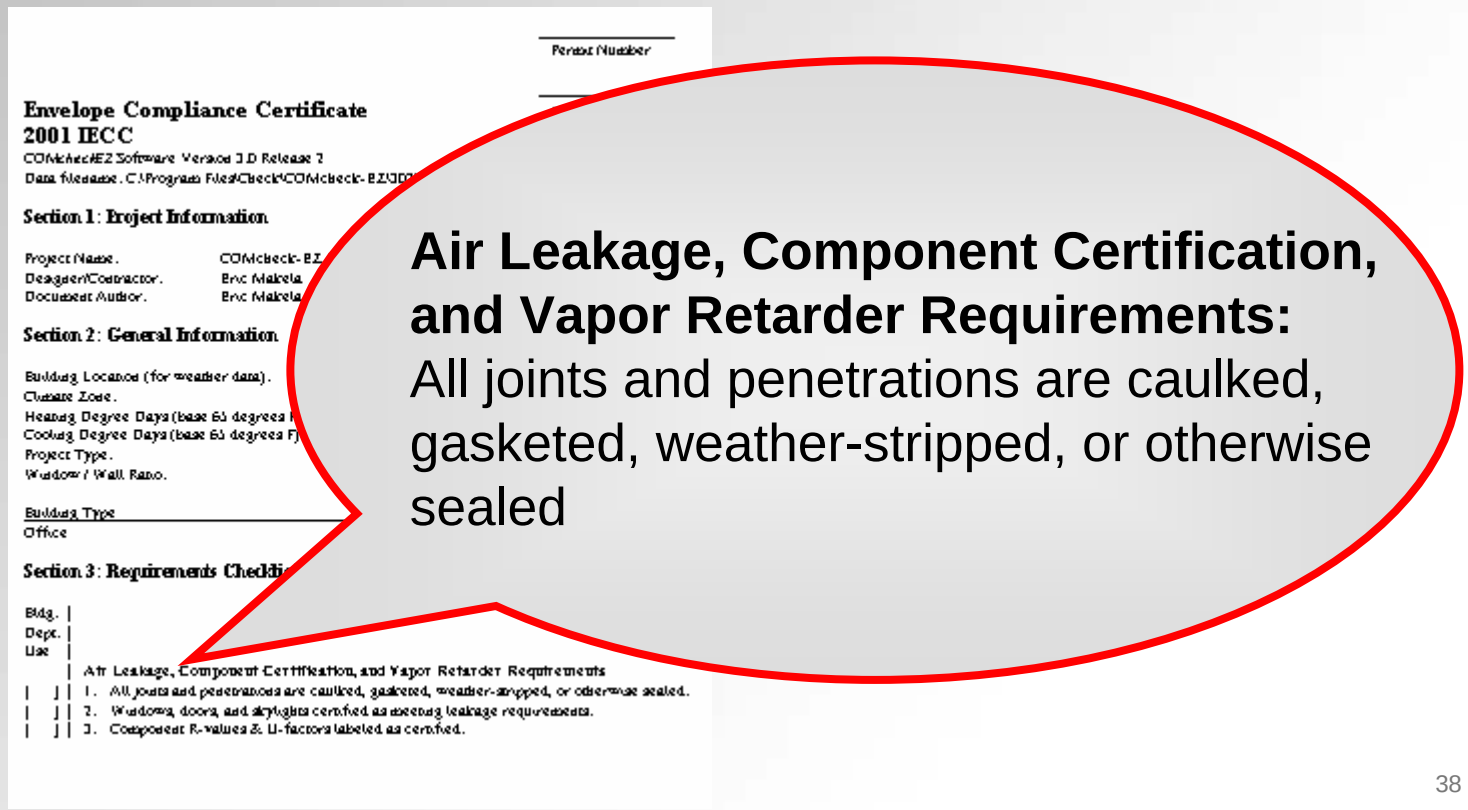
Code: 2001 IECC
File Edit View Options Code Help
Project Envelope Lighting Mechanical
HVAC System Plant Water Heating
Component
Quantity
Equipment Capacity
Fuel Type/ Heat Source
Condenser Type
System Details
Building
1 Water Heating 1 2 Click here...
2 HVAC System 4 1
3 Rooftop Packaged Heat Pu
4 HVAC System 1 1
5 Rooftop Packaged Heat Pu
6 HVAC System 2 7
7 Rooftop Packaged Heat Pu
8 HVAC System 3 2
9 Rooftop Packaged Heat Pu
Air-Cooled
Air Economizer
Service Water Heating Details
System Has a Circulation Pump
Heat Trace Tape Installed in the System
Help
OK
Cancel
Envelope TBD
Lighting -10%
Use the View Menu to display Requirements.

Mandatory Requirements in COM*check* Software

- Requirements Checklist generated automatically based on input
  - applicable code
  - building location



Permit Number

Envelope Compliance Certificate
2001 IECC
COMcheckEZ Software Version 3.0 Release 2
Data filename: C:\Program Files\Check\COMcheck-EZ\[illegible]

Section 1: Project Information

Project Name: COMcheck-EZ
Designer/Contractor: Eric Makela
Document Author: Eric Makela

Section 2: General Information

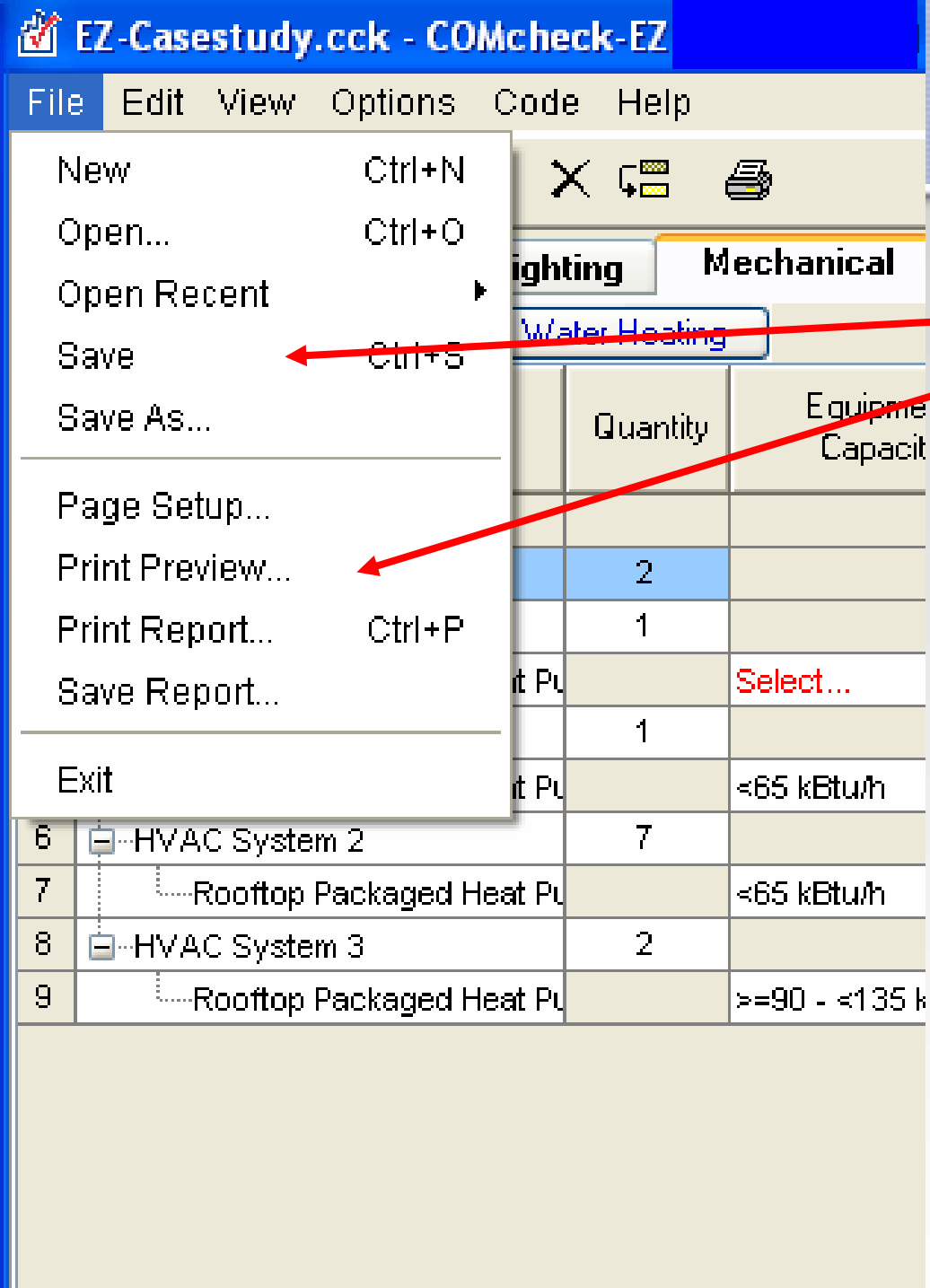
Building Location (for weather data):
Climate Zone:
Heating Degree Days (base 65 degrees F):
Cooling Degree Days (base 65 degrees F):
Project Type:
Window / Wall Ratio:

Building Type
Office

Section 3: Requirements Checklist

Bldg. Dept. Use		
		Air Leakage, Component Certification, and Vapor Retarder Requirements
	J	1. All joints and penetrations are caulked, gasketed, weather-stripped, or otherwise sealed.
	J	2. Windows, doors, and skylights certified as meeting leakage requirements.
	J	3. Component R-values & U-factors labeled as certified.

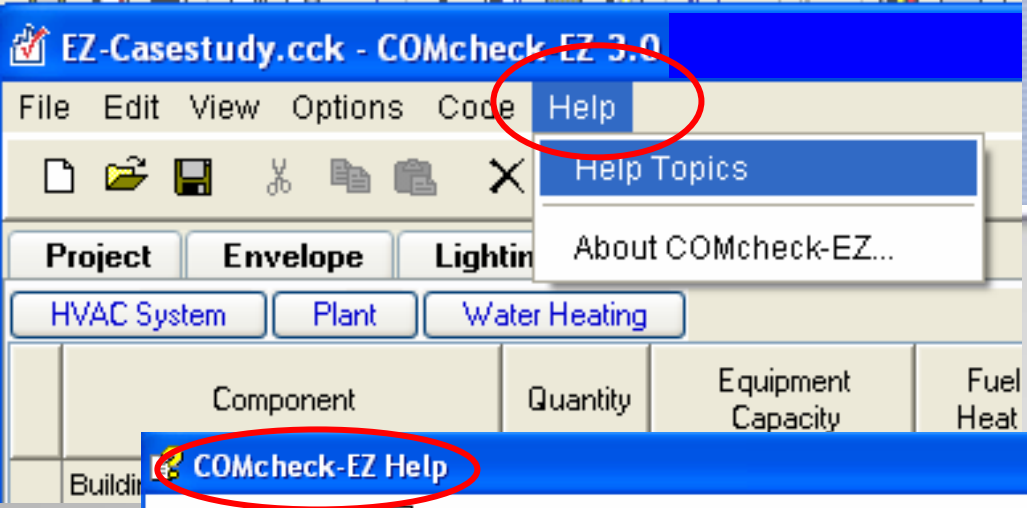
Air Leakage, Component Certification, and Vapor Retarder Requirements:
All joints and penetrations are caulked, gasketed, weather-stripped, or otherwise sealed



Be sure to save your project

Preview and Print reports

Need Help?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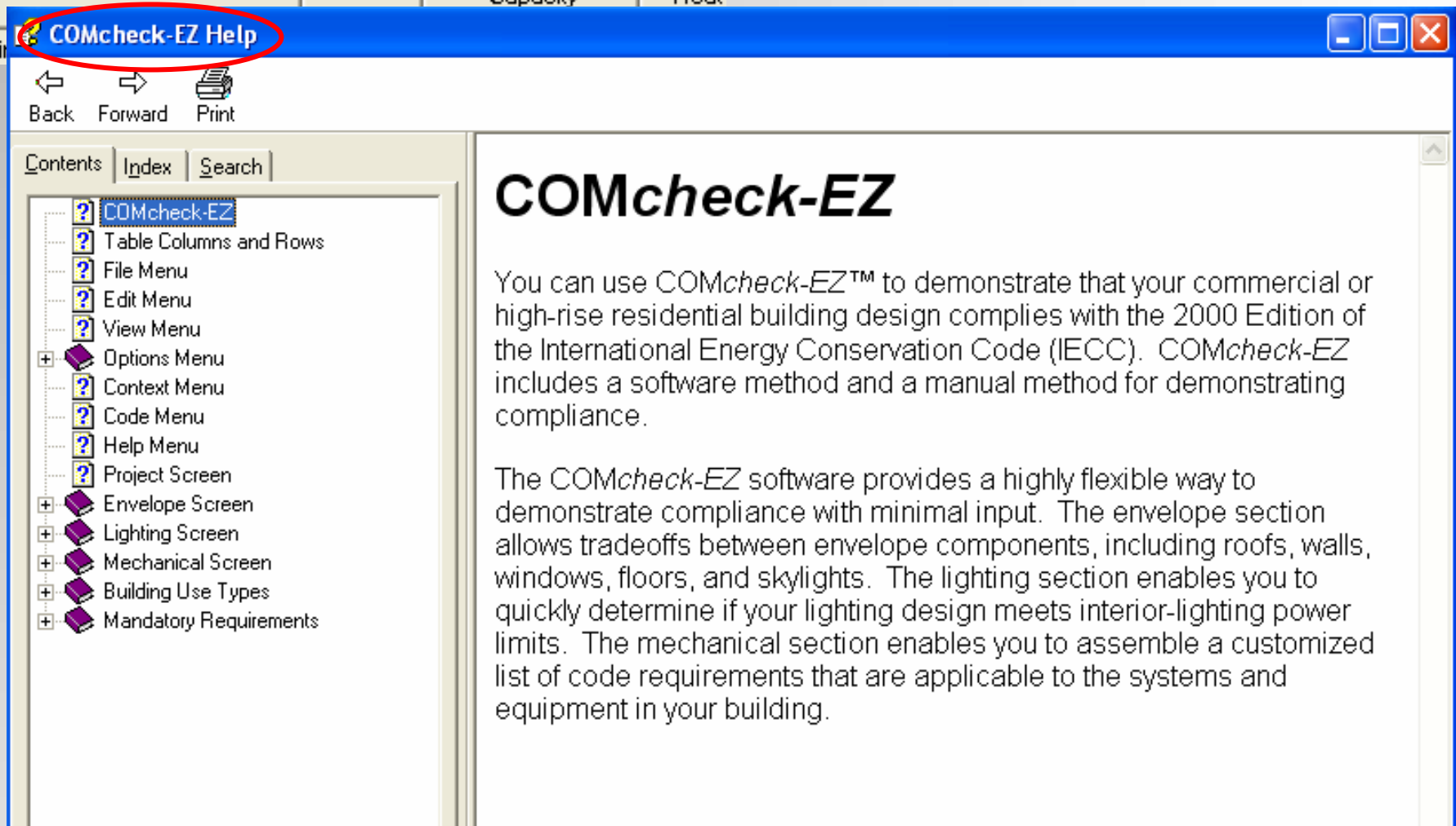
File Edit View Options Code Help
Help Topics
About COMcheck-EZ...
Project Envelope Lightin
HVAC System Plant Water Heating
Component Quantity Equipment Capacity Fuel Heat


COMcheck-EZ Help
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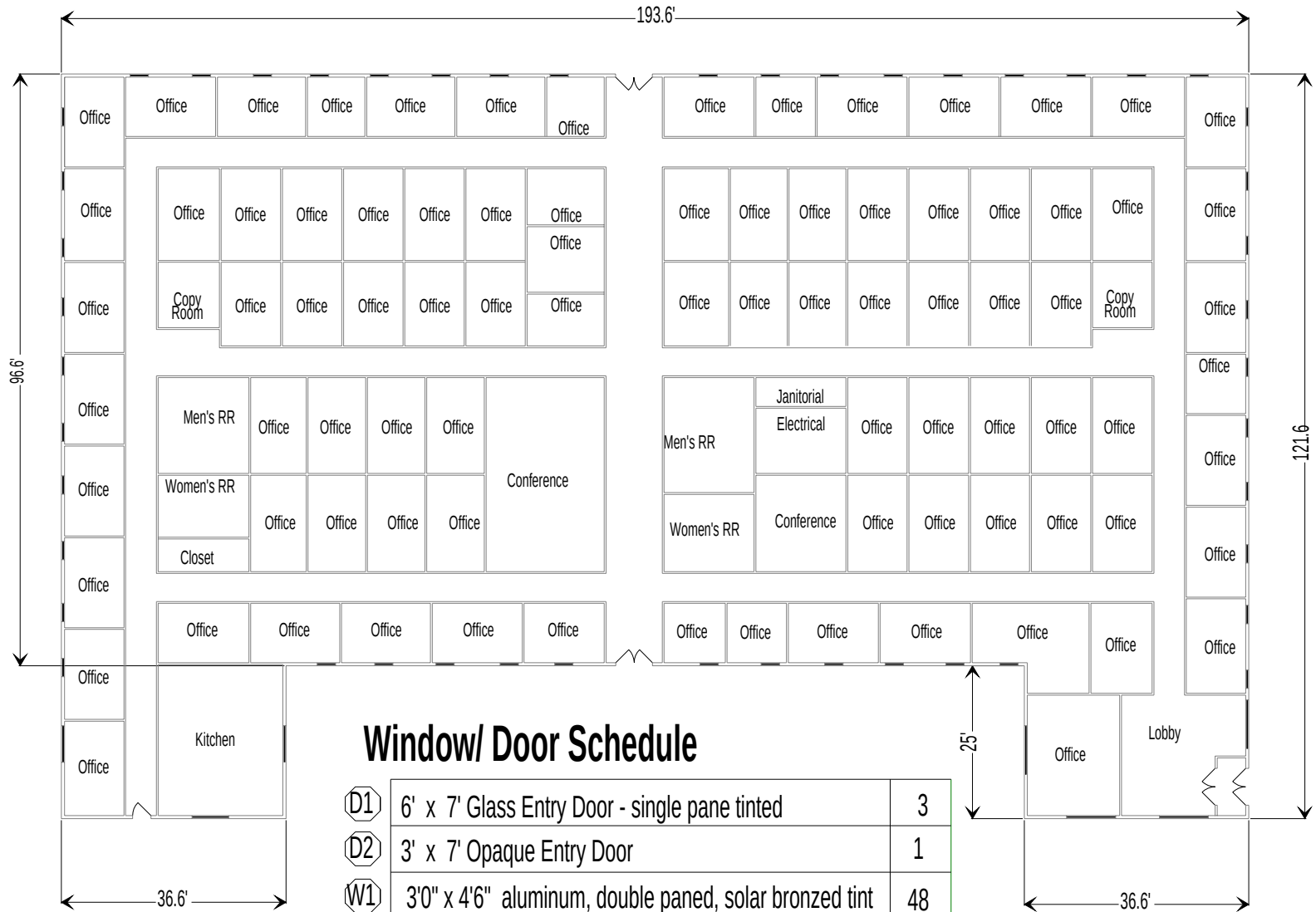
Project Screen
Envelope Screen
Lighting Screen
Mechanical Screen
Building Use Types
Mandatory Requirements
COMcheck-EZ
You can use COMcheck-EZ™ to demonstrate that your commercial or high-rise residential building design complies with the 2000 Edition of the International Energy Conservation Code (IECC). COMcheck-EZ includes a software method and a manual method for demonstrating compliance.
The COMcheck-EZ software provides a highly flexible way to demonstrate compliance with minimal input. The envelope section allows tradeoffs between envelope components, including roofs, walls, windows, floors, and skylights. The lighting section enables you to quickly determine if your lighting design meets interior-lighting power limits. The mechanical section enables you to assemble a customized list of code requirements that are applicable to the systems and equipment in your building.

COM*check-EZ* Software Case Studies

•Sigma 2 Bldg. Floor Plan



Window/ Door Schedule

D1	6' x 7' Glass Entry Door - single pane tinted	3
D2	3' x 7' Opaque Entry Door	1
W1	3'0" x 4'6" aluminum, double paned, solar bronzed tint	48
W2	8'0" x 7'0" aluminum, double paned, solar bronzed tint	4
W3	6'0" x 7'0" aluminum, double paned, solar bronzed tint	3

•Sigma 2 Bldg.
Building Envelope

Roof: 20,532 sq.ft. Wood truss R-19 Insulation

Exterior Walls: 8172 sq.ft. 2 X 4 Metal Frame at 16" O.C., R-10 Insulation

Walls Perimeter = 681 ln. ft.

Windows: 998 sq.ft. Metal Frame, double pane, tinted, U-value .69, SHGC-Value .57, P.F. .50

Window/Wall Ratio = 12%

Glass Doors: 126 sq. ft. Clear Glazing, U-value .92, SHGC-Value .47

Metal Door: 21 s.f. U-value .70

Floor: 20,532 sq. ft./681 linear feet, unheated slab on grade, no insulation

2 Storage Water Heaters, Electric, 80 gal. capacity

Activity Areas

Office: 15,849 sq.ft.

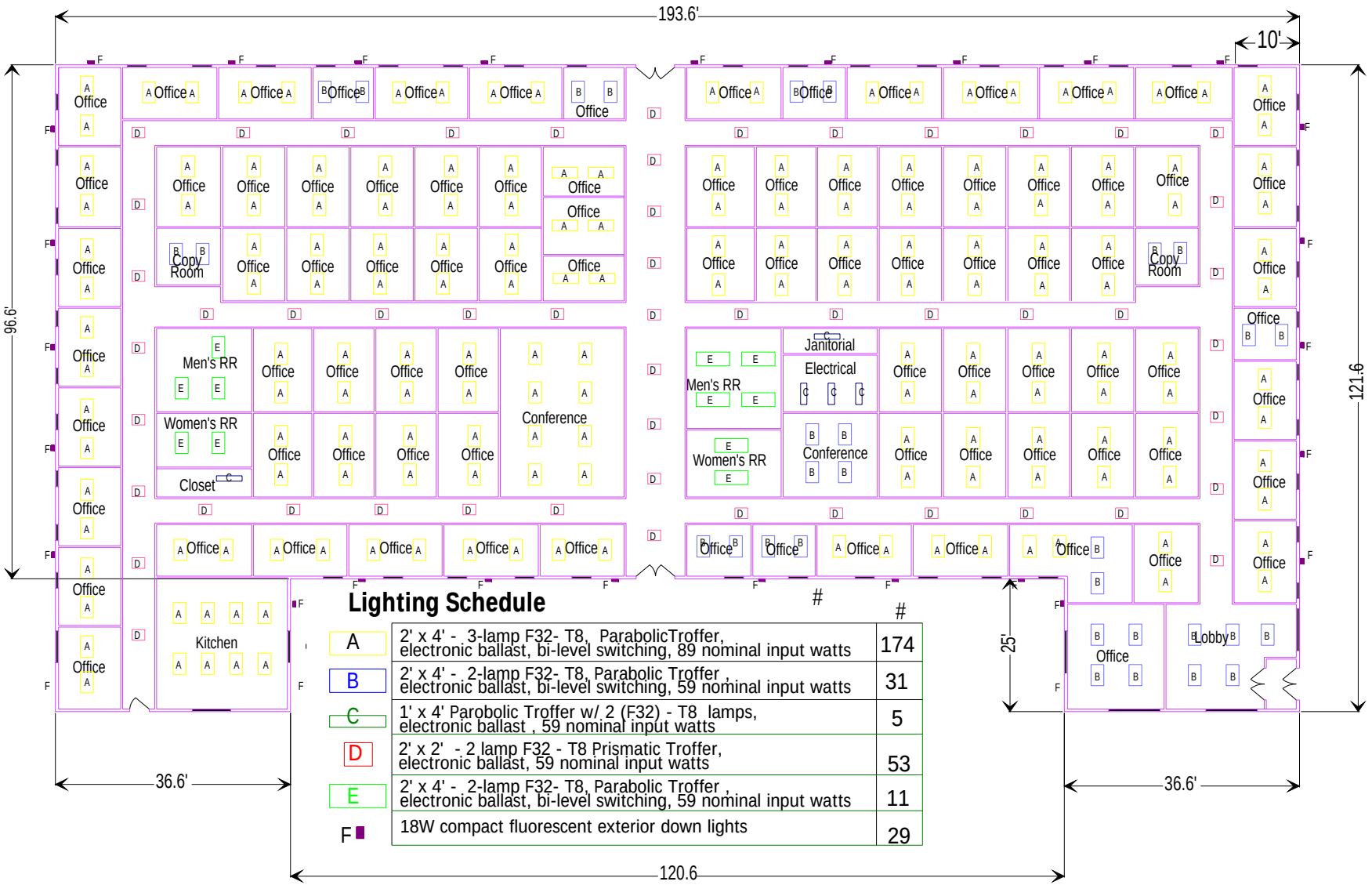
Halls/Corridors/Transitions: 3338 sq.ft.

Restrooms: 500 sq.ft.

Kitchen: 505 sq.ft.

Lobby: 340 sq.ft.

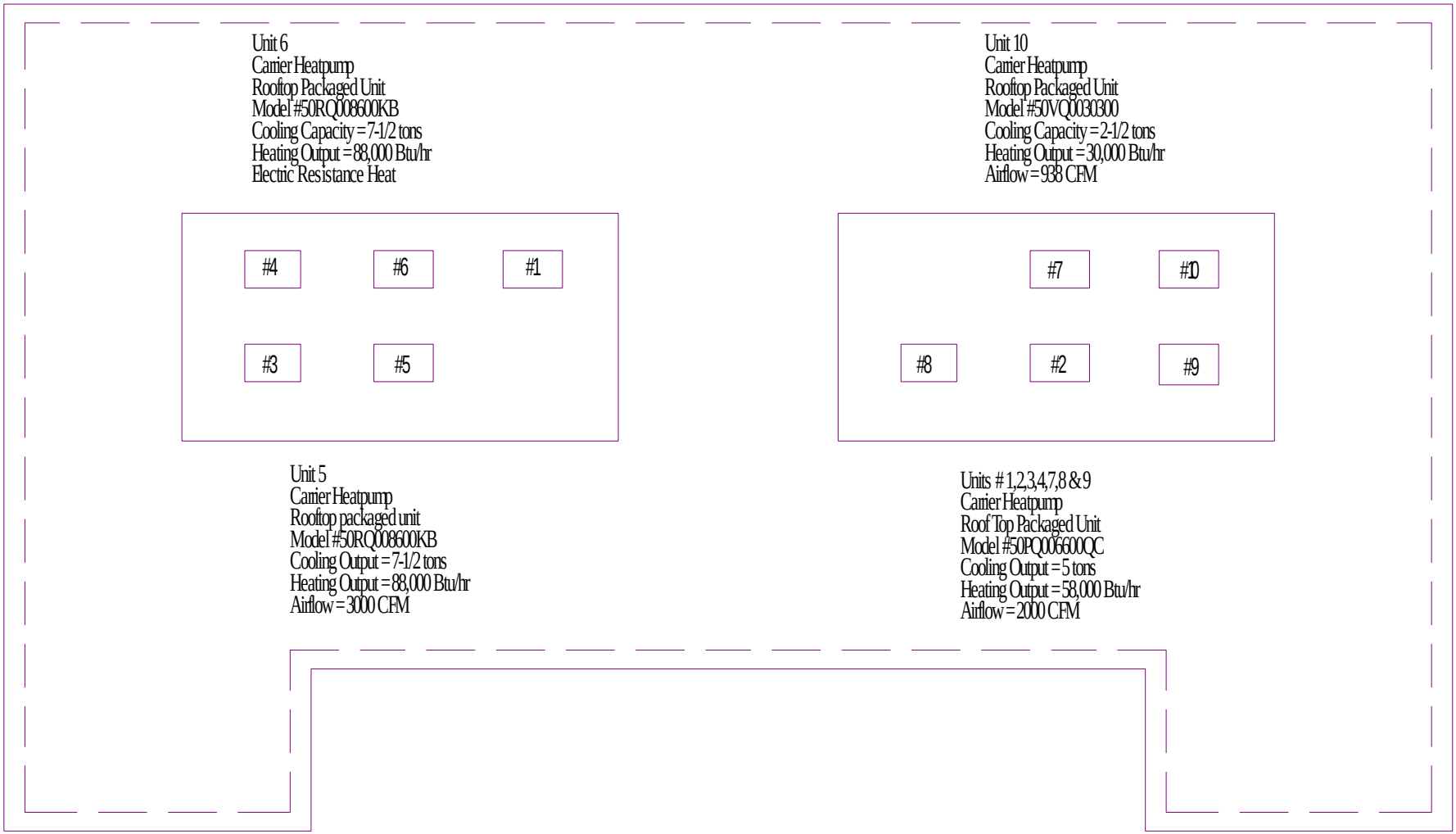
•Sigma 2 Bldg.
Lighting Plan – Existing Lighting



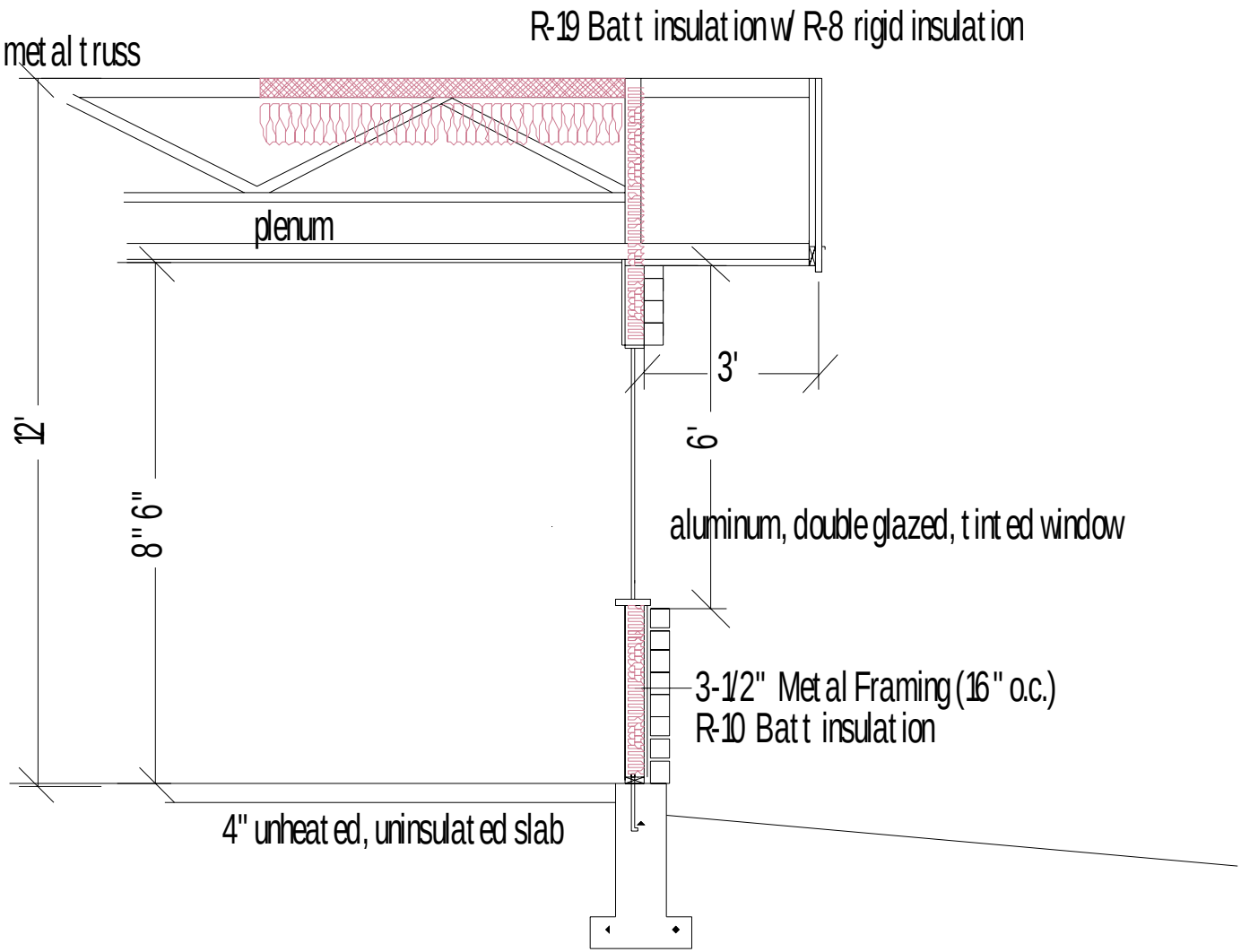
Lighting Schedule

		#
A	2' x 4' - 3-lamp F32- T8, ParabolicTroffer, electronic ballast, bi-level switching, 89 nominal input watts	174
B	2' x 4' - 2-lamp F32- T8, Parabolic Troffer , electronic ballast, bi-level switching, 59 nominal input watts	31
C	1' x 4' Parobolic Troffer w/ 2 (F32) - T8 lamps, electronic ballast , 59 nominal input watts	5
D	2' x 2' - 2 lamp F32 - T8 Prismatic Troffer, electronic ballast, 59 nominal input watts	53
E	2' x 4' - 2-lamp F32- T8, Parabolic Troffer , electronic ballast, bi-level switching, 59 nominal input watts	11
F	18W compact fluorescent exterior down lights	29

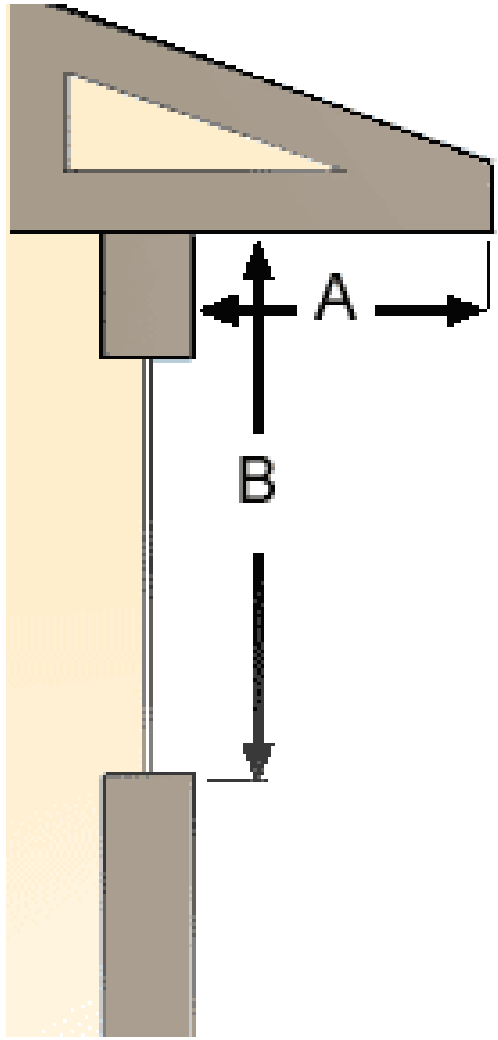
•Sigma 2 Bldg. Mechanical Plan



Building Section



Overhang/Projection Factor (PF)

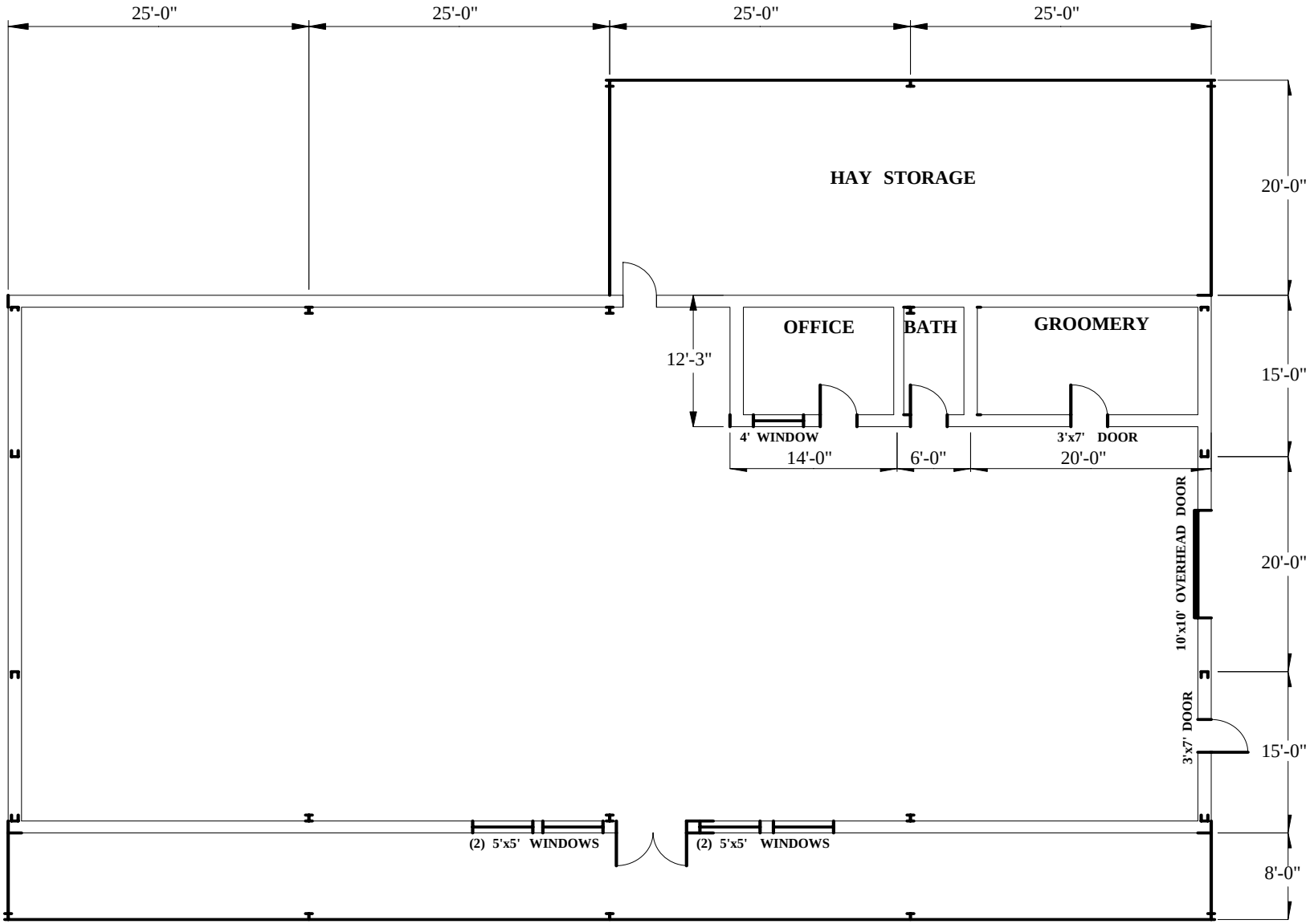


PF= A/B

PF=0.5

Red Mountain Feed & Irrigation

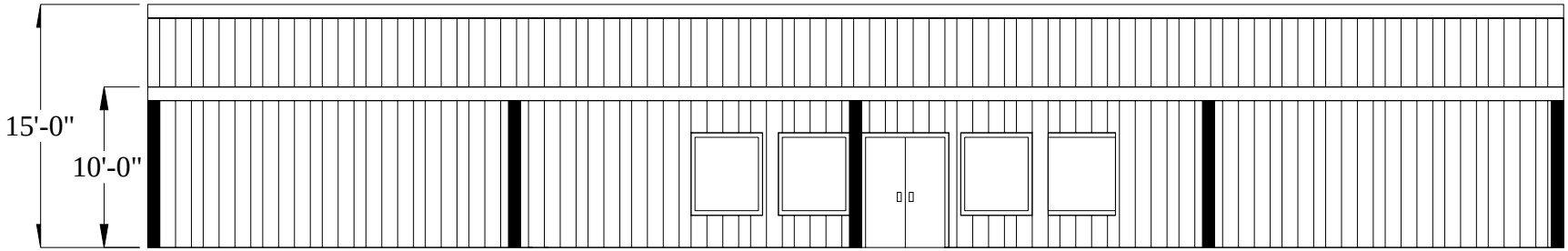
Red Mountain Feed & Irrigation Floor Plan



Spaces

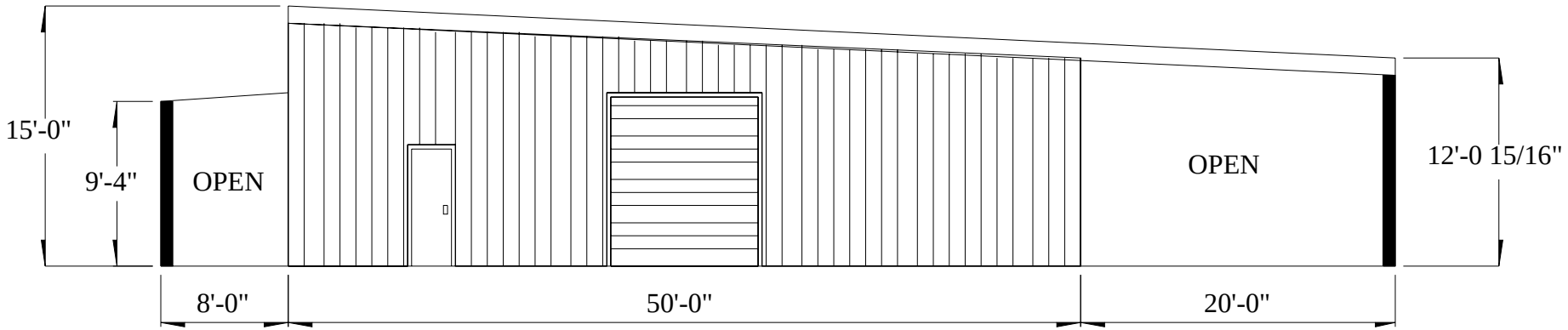
Inside Office/Bathroom

Storage

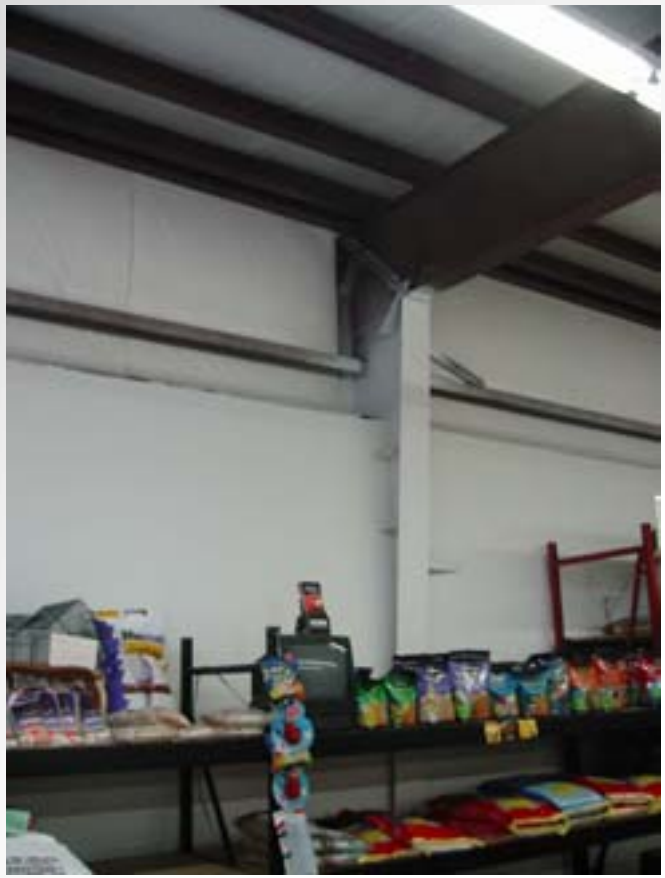


Exterior Walls: 3,954 sq.ft.

- 10’ High: R10 between girt & metal wall + 2x4 R11 metal studs, 0.071 u-factor, heat capacity=1 (2,176 sq. ft.)
- 5’ High: R10 between girt & metal wall (928 sq. ft.)

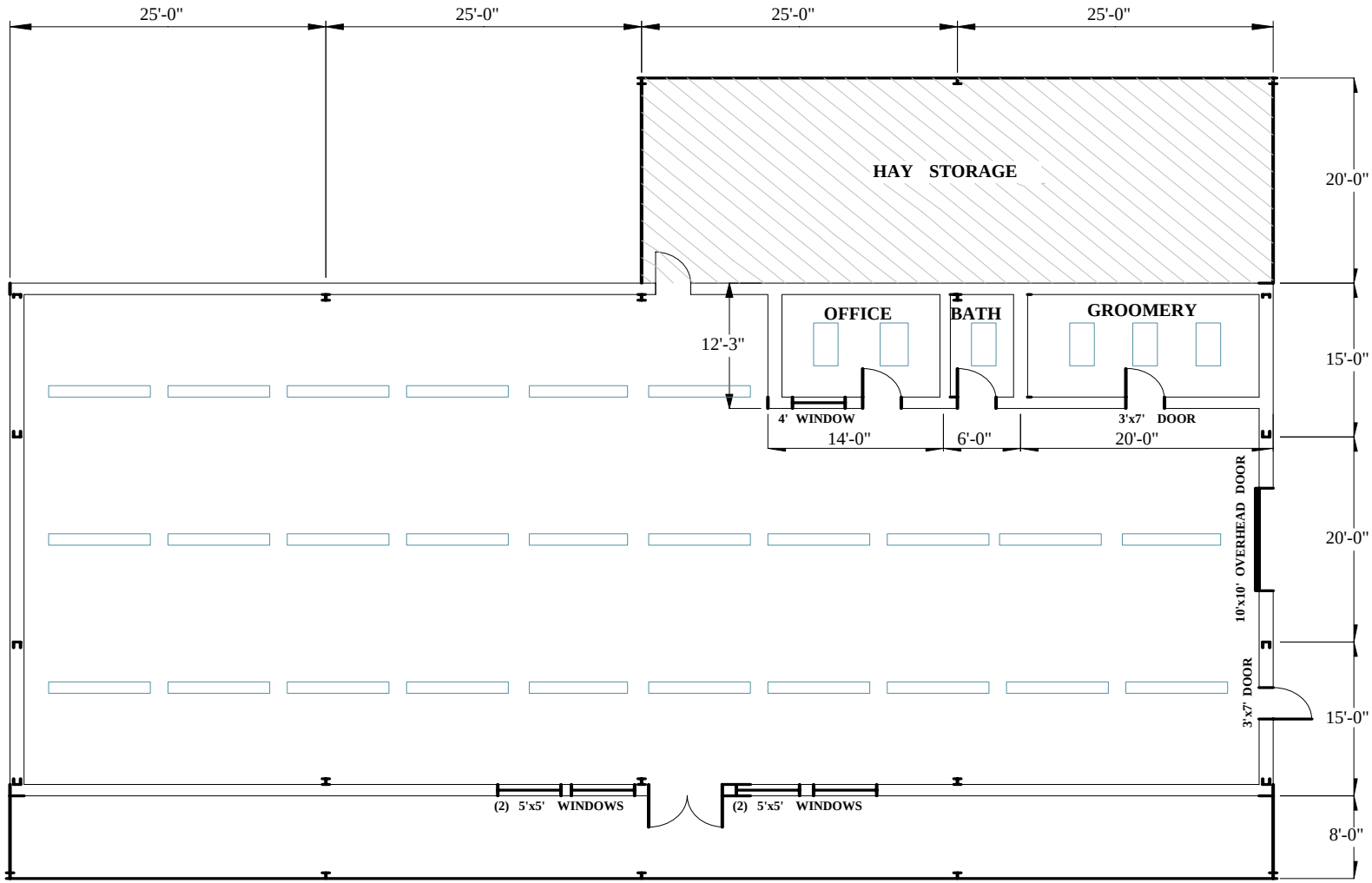


Walls



Lighting

•Red Mountain Feed
Lighting Plan



Lighting Schedule
8’ Industrial Fluorescent, 2 F96T12 Slimline Lamps & Energy Saving Magnetic Ballast
43 Fixtures, 173 watts/fixture
2’x4” Troffer 2 F32T8 lamps and GEB, 6 Fixtures, 59 watts/fixture

Heating System

Pellet Stove

Unit Heater

•Red Mountain Feed Building Envelope

Roof: 5,000 sq.ft. Metal w/1” Styrofoam thermal block, R-13 Insulation

Exterior Walls: 6,397 sq.ft.

Windows: 144 sq.ft. Metal Frame, double pane, tinted, U-factor .75, SHGC .88, PF .33

Glass Doors: 42 sq. ft., Metal Frame, U-factor .92, SHGC .87, PF, .33

Window/Wall Ratio = 2.9%

Doors: 100 sq. ft.Overhead Metal, U-value .60, other metal-42’, u-value 1.20

Floor: 5000sq.ft./300 linear feet, unheated slab on grade, R10 2’ vertical

Other COM*check* Compliance Tools

Prescriptive Approach

- Simple, fast and easy
- Generally most stringent

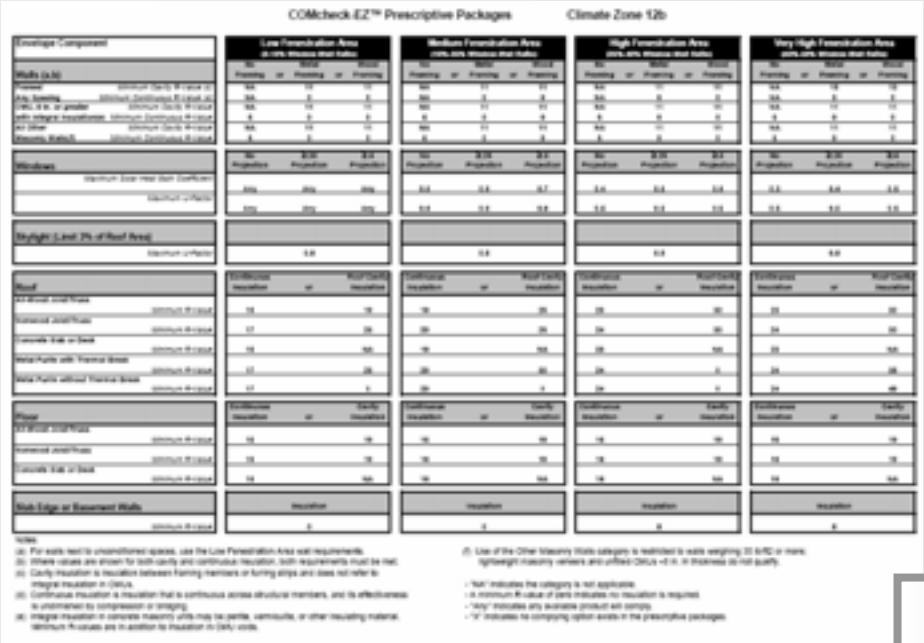
- Requires minimum input
- Based on climate and WWR
- Uses a prototype building

1 **Printed guides on www.energycodes.gov**

2 COMcheck™ Package Generator

COM*check* Printed Guides

1 **Pick the appropriate package based on WWR, Zone and code**



COMcheck-EZ™ Prescriptive Packages Climate Zone 12b

Envelope Component	Low Fenestration Area ≤ 10% Window-Wall Ratio	Medium Fenestration Area 10% < Window-Wall Ratio ≤ 20%	High Fenestration Area 20% < Window-Wall Ratio ≤ 30%	Very High Fenestration Area 30% < Window-Wall Ratio ≤ 40%
Walls (U-0.124)				
Windows				
Skylight (Limit 3% of Roof Area)				
Roof				
Floor				
Slab-Edge or Basement Walls				

Notes

(a) For walls next to unconditioned spaces, use the Low Fenestration Area wall requirements.

(b) Where values are shown for both cavity and continuous insulation, both requirements must be met.

(c) Cavity insulation is insulation between framing members or furring strips and does not refer to integral insulation in CMUs.

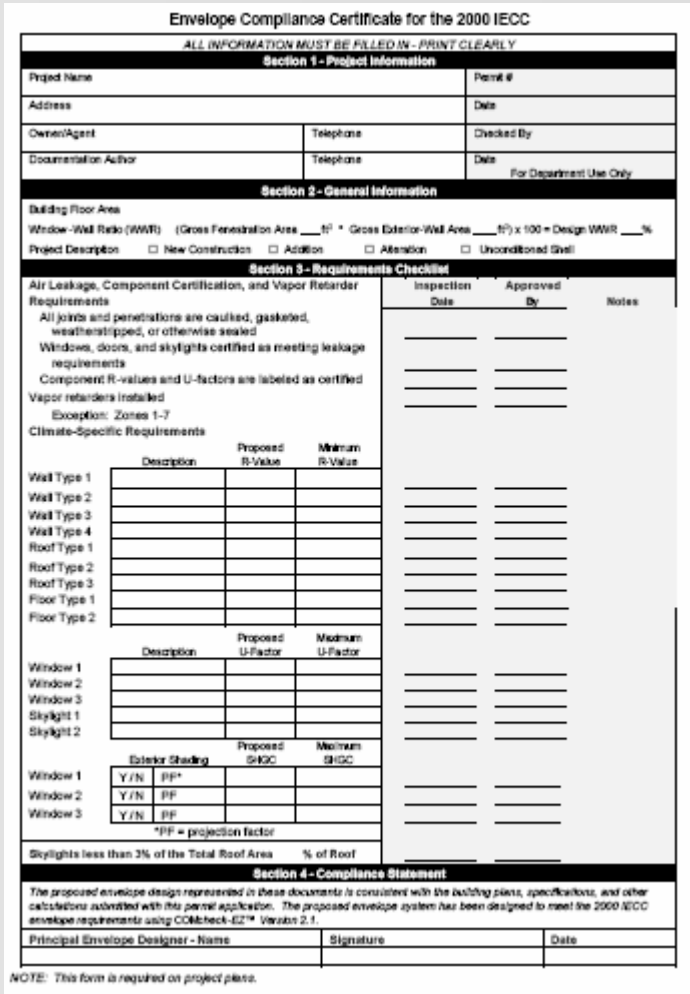
(d) Continuous insulation is insulation that is continuous across structural members, and its effectiveness is unaffected by compression or bridging.

(e) Integral insulation in concrete masonry units may be perlite, vermiculite, or other insulating material. Minimum R-values are in addition to insulation in CMU cores.

(f) Use of the Other Masonry Walls category is restricted to walls weighing 30 lb/ft2 or more. lightweight masonry veneers and unfilled CMUs <4 in. in thickness do not qualify.

- "NA" indicates the category is not applicable.
- A minimum R-value of zero indicates no insulation is required.
- "Any" indicates any available product will comply.
- "X" indicates no complying option exists in the prescriptive packages.

2 **Print out and complete the Prescriptive Package Worksheet, sign, and submit**



Envelope Compliance Certificate for the 2000 IECC

ALL INFORMATION MUST BE FILLED IN - PRINT CLEARLY

Section 1 - Project Information

Project Name		Permit #
Address		Date
Owner/Agent	Telephone	Checked By
Documentation Author	Telephone	Date For Department Use Only

Section 2 - General Information

Building Floor Area

Window-Wall Ratio (WWR) (Gross Fenestration Area ___ft² ÷ Gross Exterior-Wall Area ___ft²) x 100 = Design WWR ___%

Project Description ☐ New Construction ☐ Addition ☐ Alteration ☐ Unconditioned Shell

Section 3 - Requirements Checklist

Air Leakage, Component Certification, and Vapor Retarder Requirements	Inspection Date	Approved By	Notes
All joints and penetrations are caulked, gasketed, weatherstripped, or otherwise sealed			
Windows, doors, and skylights certified as meeting leakage requirements			
Component R-values and U-factors are labeled as certified			
Vapor retarders installed			
Exception: Zones 1-7			

Climate-Specific Requirements

	Description	Proposed R-Value	Minimum R-Value
Wall Type 1			
Wall Type 2			
Wall Type 3			
Wall Type 4			
Roof Type 1			
Roof Type 2			
Roof Type 3			
Floor Type 1			
Floor Type 2			

	Description	Proposed U-Factor	Maximum U-Factor
Window 1			
Window 2			
Window 3			
Skylight 1			
Skylight 2			

	Exterior Shading		Proposed SHGC	Maximum SHGC
Window 1	Y/N	PF*		
Window 2	Y/N	PF		
Window 3	Y/N	PF		

*PF = projection factor

Skylights less than 3% of the Total Roof Area % of Roof

Section 4 - Compliance Statement

The proposed envelope design represented in these documents is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed envelope system has been designed to meet the 2000 IECC envelope requirements using COMcheck-EZ™ Version 2.1.

Principal Envelope Designer - Name	Signature	Date

NOTE: This form is required on project plans.

Forms available at www.energycodes.gov

COM*check* Printed Guides

1 **Complete the Lighting Application Worksheet**

2 **Print out and complete the Prescriptive Package Worksheet, sign, and submit**

Lighting Application Worksheet for the 2000 IECC

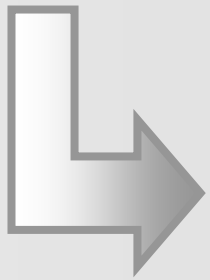
Section 1 - Allowed Lighting Power Calculation

A Building or Area Type	B Entire Building (watts per sq ft)	C Tenant Area or Portion of Building (watts per sq ft	D Building or Space (sq ft)	E Allowed Watts* (B or C x D)
Auditorium	NA	1.6		
Bank/financial institution*	NA	2.0		
Classroom/lecture hall*	NA	1.6		
Convention, conference or meeting center*	NA	1.8		
Corridor, restroom, support area	NA	0.8		
Dining*	NA	1.4		
Exercise center*	1.4	1.1		
Exhibition hall	NA	3.3		
Grocery store*	1.9	2.1		
Gymnasium playing surface	NA	1.9		
Hotel function*	NA	2.4		
Industrial work, < 20 ft ceiling height	NA	2.1		
Industrial work, ≥ 20 ft ceiling height	NA	3.0		
Kitchen	NA	2.2		
Library*	1.5	1.8		
Lobby—hotel*	NA	1.9		
Lobby—other*	NA	1.0		
Mall, arcade, or atrium	NA	1.4		
Medical and clinical care*	1.0	1.6		
Museum*	1.0	1.6		
Office*	1.3	1.5		
Religious worship*	2.2	3.2		
Restaurant*	1.7	1.7		
Retail sales, wholesale showroom*	1.9	2.1		
School	1.5	NA		
Storage, industrial and commercial	0.6	1.0		
Theater—motion picture	1.1	1.0		
Theater—performance*	1.4	1.6		
Other	0.6	1.0		
			Basic Allowed Watts (subtotals)	

*You may use only Column B or Column C. Do not use more than one column.

Additional Power Allowances**

F Area Type/Allowance Type	G Qualifying Power (watts)	H Maximum Allowance (watts per sq ft	I Area (sq ft)	J Allowance Smaller of (E or (C×D))
			Additional Allowed Watts (subtotals)	
			Total Allowed Watts	



Lighting Compliance Certificate for the 2000 IECC

ALL INFORMATION MUST BE FILLED IN - PRINT CLEARLY

Section 1 - Project Information

Project Name		Permit #
Address		Date
Owner/Agent	Telephone	Checked By
Documentation Author	Telephone	Date For Department Use Only

Section 2 - General Information

Building Floor Area

Project Description ☐ New Construction ☐ Addition ☐ Alteration

Method of Lighting Compliance ☐ Entire Building ☐ Tenant Area or Portion of Building

Section 3 - Requirements Checklist

	Inspection Date	Approved By	Notes
Controls, Switching, and Wiring			
Independent controls for each space (switch/occupancy sensor) Exceptions: security lighting building lobby/retail store/mall			
Master switch at entry to each hotel/motel guest room			
Two switches, dimmer, or occupancy sensor in each space providing a uniform illumination pattern Exceptions: the area has only one luminaire an occupant-sensing device controls the area the area is a corridor, storage area, restroom, or lobby			
Photocell or astronomical time-switch on exterior lights Exception: large covered areas requiring lighting during daylight hours			
Tandem-wired one-lamp and three-lamp ballasted luminaires Exceptions: electronic high-frequency ballasted luminaires luminaires not on same switch			
Interior Lighting Total actual watts must be less than or equal to total allowed watts			
Allowed Watts / Actual Watts / Lighting Complies (Y/N)			
External Lighting Type(s) of exterior lighting sources: ☐ fluorescent ☐ metal halide ☐ high-pressure sodium			
Lighting from electrical service: minimum of 45 lumens per watt Exceptions: specialized signal, directional, and marker lg. lighting highlighting exterior features of historic building lighting integral to advertising signage safety or security lighting low-voltage landscape lighting			

Section 4 - Compliance Statement

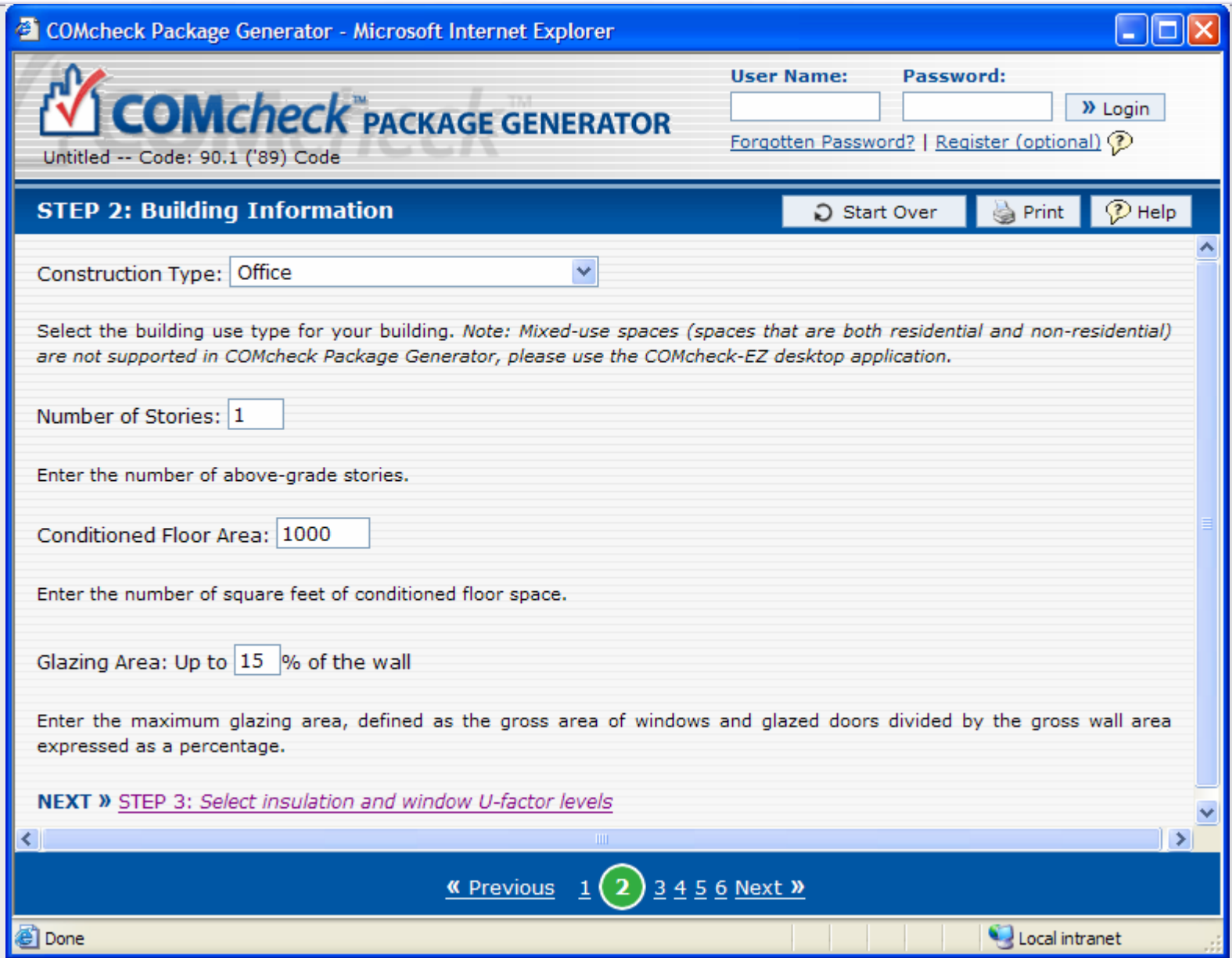
The proposed lighting design represented in these documents is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed lighting system has been designed to meet the 2000 IECC lighting requirements using COMcheck-EZ™ Version 2.1.

Principal Lighting Designer - Name	Signature	Date

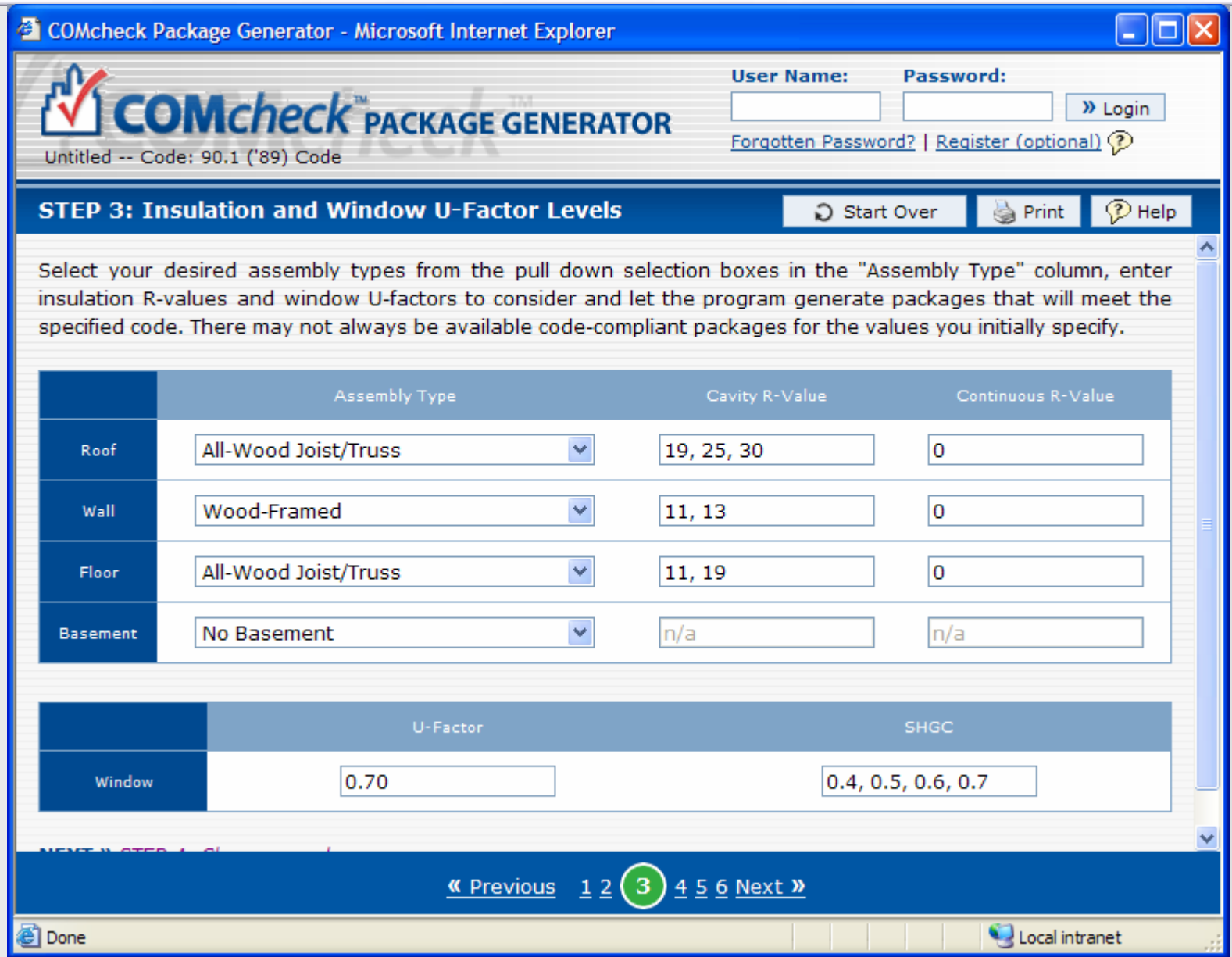
NOTE: *This form is required on project plans. The Lighting Application Worksheet may be incorporated into the lighting schedule.*

Forms available at www.energycodes.gov

COM*check* Package Generator



COM*check* Package Generator



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